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Effect of balloon blowing exercise vs modified cervical exercise along with Swiss ball exercise on the lung capacity of patient suffering from text neck syndrome due to improper posture

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Abstract---Background: Text neck syndrome is more likely to produce neck discomfort and soreness. The aim of this study is to see how Balloon Blowing Exercise compares to Modified Cervical Exercise and Swiss Ball Exercise in terms of lung capacity in patients with Text Neck Syndrome caused by poor posture. Methodology: A total of 30 students (N=30) were chosen and divided into two groups of 15 each (N1=15) (N2=15). They were randomly separated into two groups (Group 1 and Group 2). Group 1 consisted of fifteen (N=15) individuals who were given a balloon blowing activity. The modified cervical exercise along with Swiss ball exercise were used on Fifteen people in Group 2 (N=15). Four weeks of intervention were given to the participants. Prior to the intervention, demographic data was obtained, students were requested to complete the NDI questionnaire, and a rural test measurement was performed. Before and after the intervention period, a spirometry test was performed to determine FEV and FVC. Result: The results showed improvement in FEV and FVC of balloon Blowing exercise group and modified cervical exercise along with Swiss ball exercise. Conclusion: There was more improvement in FEV and FVC of balloon blowing exercise group as compared to the group that received modified cervical exercises along with Swiss ball exercise.

Keywords---cervical exercise, Swiss ball exercise, lung capacity, neck syndrome.

Introduction

Text neck syndrome, also known as turtle neck posture, is a sort of repeated tension coming from prolonged texting on a portable device, causing neck damage and stiffness [1]. Those who are addicted to mobile devices and spend the majority of their time on them get neck pain, upper back pain, persistent headaches, developing spine curvature, and discomfort [1]. According to a recent study, 79.1% of adults aged 18 to 44 carry their cell phones with them almost all of the time, with only 2. hours of walking time wasted without them [1] Musculoskeletal problems are likely to worsen over time. Especially when users maintain a stretched neck while looking at their phones. Overuse of a smartphone can cause cervical angle changes, most commonly when users do not maintain proper posture and place additional strain on it [1 may adopt a forward head position as a result of these dramatic changes in the cervical, which can cause muscle discomfort and reduced neck mobility (FHP) [2]. Users with neutral standing have a higher forward head position when seeing the mobile phone screen, according to a 2015 study by Guan x [3]. The user's poor posture may affect the muscular balance of the cervical spine, thoracic spine, and shoulder blades [2]. Text neck is a possibility of early wear and damage to the spine, as well as spinal loss, is caused by the repeated pulling and stretching in this area, resulting in muscle strain, pinched nerves, and ruptured discs[4]. Although the capacity of the chest wall to inflate and compress properly during expiration is limited [2]. Developing forward head position as a result of chronic leaning forward, according to Park et al and Amodei et al, can alter lung function [11,32]and hanged mechanics of the cervical and thoracic spine has been linked to forward head posture produced by neck tilting while staring at a smartphone, restricting and alter the capacity of the lung[2]. According to the findings, 83. percent of patients is with neck pain (due to bad posture) had altered breathing patterns, and long-term smartphone use and a sedentary lifestyle had an impact on lung function[5]. incorrect posture causes a loss of cervical muscular strength, which has been linked to a loss of respiratory muscle strength [6,7] the integrity of the cervical and thoracic spine, as well as the rib cage system, might be jeopardized by cervical muscular weakness. Due to biomechanical changes in the rib cage, restricting the function of the chest wall may reduce the strength of respiratory muscle[2]. Although the higher kyphotic posture in the upper thoracic region among users is due to their forward head posture, which raises internal thoracic pressure during expiration, potentially affecting the dynamic mechanism of lung function. This thoracic cage displacement could also induce resistance curing exhales, which could compromise lung function [8,9]. The alignment of the neck and shoulder muscles, which are directly engaged in breathing, provides optimal respiratory efficiency. Normal breathing is impaired by a muscle imbalance caused by stress, weakness, or paralysis as a result of repeatedly pushing your head forward, which shortens and weakens these muscles, causing breathing to alter [10] Trapezius and SCM muscles, as well as the pectoralis major and scalene muscles, may lose strength and function as a result of changes in the cervical and thoracic spine[11] the antagonist trapezius muscle may

shorten as a result of these changes in head posture, while the SCM and scalene muscle lengthen[12]. As a result, the respiratory muscle's function may be compromised [13,14].

It was discovered that core strengthening exercise enhanced RHR and VO₂ max capacity, as well as FEV and FEV₁ respiratory parameters [15]. However, when it comes to joint muscles, swiss balls are quite beneficial. These exercises serve to increase core muscle activation while also strengthening the muscles [16]. The use of a ball in a 90/90 bridge position with a balloon blowing exercise was found to improve pulmonary function and lung capacity, increasing FVC and FEV₁[17].

It was also discovered that people suffering from forward head position as a result of extended use of showed considerable improvement in their posture when they conducted modified cervical exercises [18]. Various studies have shown that modified cervical exercise improves (MCE) forward head posture(FHP), and many studies have shown a link between reduced lung capacity and forward head posture. There is also literature on the effect of swiss ball exercise for core strengthening on improving lung capacity, despite the fact that many studies have shown that balloon exercise improves lung capacity. However, no studies comparing the effects of balloon blowing exercise vs. modified cervical exercise with Swiss ball exercise on lung capacity have been undertaken. As a result, the goal of this study is to compare the effects of balloon blowing vs. modified cervical exercise combined with Swiss ball exercise on lung function in patients with text neck syndrome caused by poor posture.

Aim And Objective of The Study

Aim

Aim of the study is to see the effects of Balloon blowing exercise VS modified cervical exercise (MCE) along with Swiss ball exercise on lung capacity of patients suffering from text neck due to improper posture.

Objective

1. To compare Lung capacity of balloon blowing exercise group vs modified cervical exercise along with Swiss ball in text neck syndrome.
2. To assess the text neck syndrome by ruler measurement.
3. To assess the dysfunction of the neck by NDI.

Methodology

Study Design: Experimental Study

Sample Size: Thirty(N=30) Untrained students from Galgotias University divided into 2 groups

- Group 1: Balloon blowing Exercise(N=15)
- Group 2: Modified Cervical Exercise (MCE) along with Swiss Ball(N=15)

Place: Galgotias University

Sampling Method: Simple Method Sampling

Time Period of Study: From the clearance of RRC- May 2021

Inclusion criteria

- College student from 18-25 of age.[1]
- Minimum duration of smart phone used more than 6 hours.[19]
- Sedentary Lifestyle [1]

Exclusion criteria

- Subject with congenital cervical problem.[1]
- Traumatic and pathological cervical problem[1]
- Spinal cord injury[1]
- Had undergone thoracic or abdominal surgery[1]

Outcome measure

- NDI
- Ruler Test Management
- Spirometry

Data Analysis

Data analysis was driven out using the SPSS 21.0 edition of the Social Science Packaging Software. The before and post readings were compared using a paired t test within the group. MS EXCEL 2016 is used to create the graphical depiction.

Results and Discussion

As demonstrated in the tables below, the results are quite apparent and suggest that there is a difference in lung capacity between the two groups once the intervention is done.

Tables Description

Table.1 gave data about the demographics of the population.

Table.2 contains the gender distribution of each grouping

Table.3 includes ruler test measurement comparison and P-value, as well as NDI for groups 1 and 2.

Table 4 includes FVE pre and post comparisons, p-values, and T-tests for groups 1 and 2 are included. The P-values of both groups are less than 0.005, but the T-test value of group-1 is substantially higher than the T-test value of group-2, indicating that group-1 has a greater effect than group-2 as a result, Reject the Null Hypothesis

Table5 includes T-test value and P-value of FVC pre and post comparison for groups 1 and 2. This table demonstrates that both groups have P-values less than 0.005, but group-1 has a higher T-test value than group-2, indicating that group-1 is more effective, thereby rejecting the null hypothesis

Table 1: Demographics Statistics

VARIABLES	n	MEAN±SD
AGE	30	23.47±2.417
WEIGHT (kg)	30	65.10±8.592
HEIGHT (cm)	30	171.53±9.369

Graph Representation Of Demographics

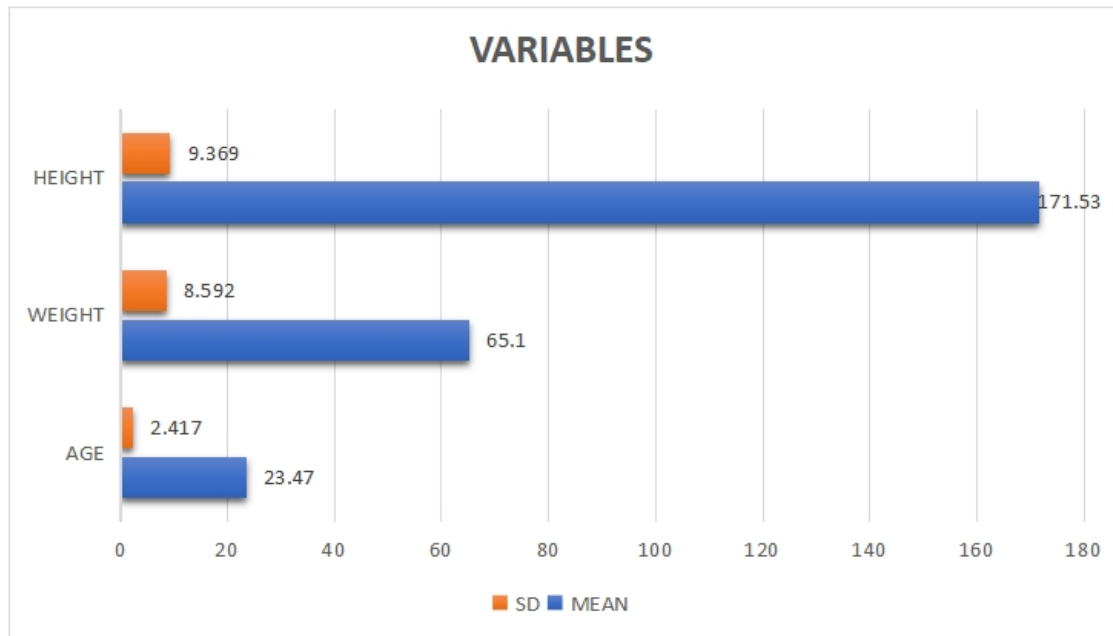


Table 2 Frequency Of Genders Of Both Groups

	MALE(n)	FEMALE(n)
GROUP 1(n 15)	9	6
GROUP 2(n 15)	6	9

The independent t-test is used to analyze the group 1 and 2 ruler test and NDI in this table, and the findings reveal a significant difference in the mean in both tests.

Table 3 -Comparison Of Group 1 And Group 2 (Independent T-Test)

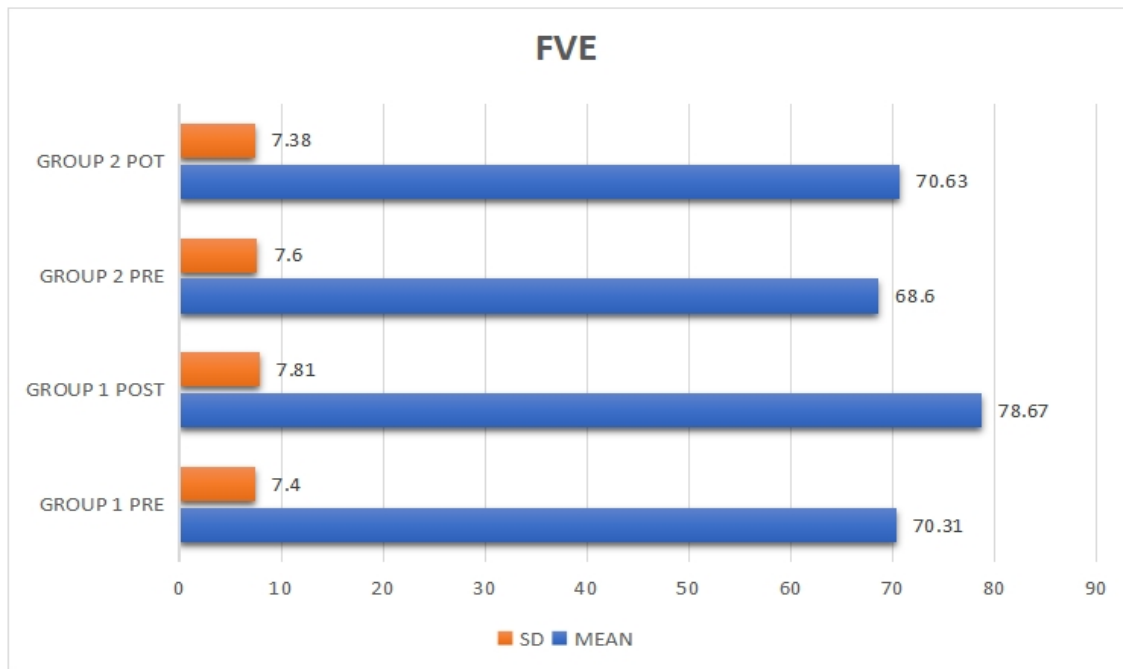
	GROUP 1	GROUP 2	T TEST	P VALUE
RULER TEST(cm)	12.83±1.38	13.20±1.06	0.813	0.423
NDI	16.06±2.37	16.53±2.55	0.518	0.609

In this table, there is a considerable impact in pre and post scoring in both groups with a p value of 0.05 in both. Comparison of FVE pre and post of group 1 and group 2 as a paired t test shows that there is a significant difference in pre and post scoring in both groups with a p value of 0.05 in both. The t-test value for group 1 is higher than for group 2, showing that group 1 has a greater influence than group 2.

Table 4 -Comparison Of Group 1 And Group 2 FVE Pre And Post (Paired T-Test)

	GROUP 1	GROUP 1	GROUP 2	GROUP 2
	FVE PRE	FVE POST	FVE PRE	FVE POST
MEAN±SD	70.31±7.40	78.67±7.81	68.60±7.60	70.93±7.38
T-TEST		22.678		7.321
P VALUE		P <0.05		P <0.05

Graph Comparison Fve Pre And Post Of Group 1 And Group 2



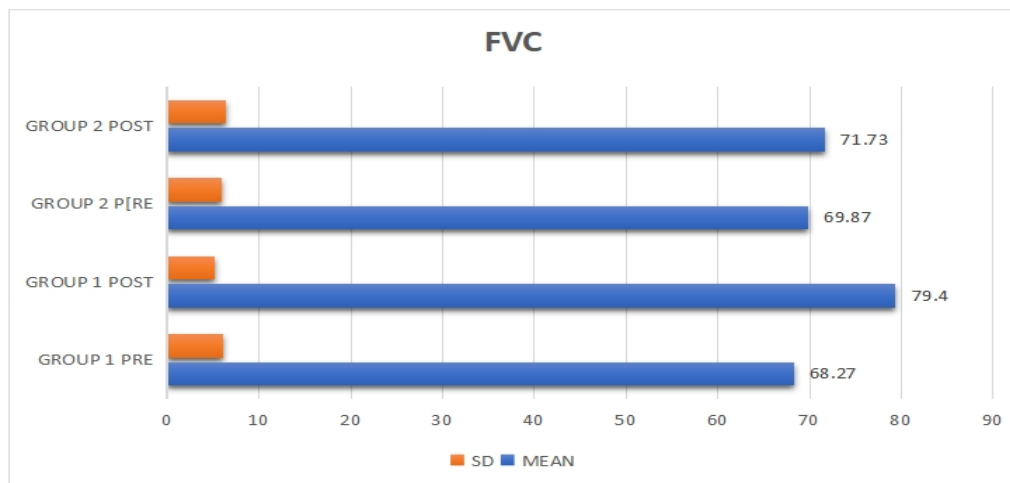
This table shows a paired t test comparison of FVC pre and after in groups 1 and 2. In both groups, there is a considerable impact between pre and post scoring, with a p value of 0.05 in both. The t-test value of group one is higher than that of group two, indicating that group 1 has a greater influence than group 2.

Table 5 -Comparison Of Group 1 And Group 2 FVC Pre And Post (Paired T-Test)

	GROUP 1	GROUP 1	GROUP 2	GROUP 2
	FVC PRE	FVC POST	FVC PRE	FVC POST
MEAN±SD	68.27±6.07	79.40±5.15	69.87±5.93	71.73±6.34

T-TEST		17.846		7.299
P-VALUE		P <0.05		P <0.05

Graph Showing Comparison FVC Pre And Post Of Group 1 And Group 2



Discussion

The objective of this study was to examine the effect of balloon blowing exercise vs modified cervical exercise along with swiss ball exercise. The natural curve of the cervical angle and the morphology of the cervical I spine of smartphone users have been seen to vary with different degrees of neck flexion, according to Park j et al. [20]. When compared to persons who have a more upright posture, people with a bigger thoracic kyphosis show a significant loss in lung function, according to Loberg et al [12]. The kyphotic posture that has evolved among frequent smartphone users, according to Kang et al, has the potential to damage lung function [21]. Han jet at in 2016 and Hojat B et al in 2011 also discovered that a slumped posture caused by poor habitual posture can have a negative impact on lung function [11,22]. According to Han j's 2016 study. Adult males and females with forwarding head position had I over FVC and FEV1 values than those without forwarding head posture [11]. Forward head posture has a deleterious influence on respiratory function, according to se-yon Kim, who discovered the in2013 [23]. In addition, Eun Kyung Koh et al. In 2013 discovered that in forward head posture, muscle activity of the S CM and scalene during inspiration were much lower [24].

So the Spirometry tests were done on both groups before and after the intervention, and both groups showed considerable improvement in the tests used to determine FEV and FVC. However, the FEV and FVC of lung capacity appear to improve more in the group that received balloon blowing exercise.

The above studies show that individuals performing balloon exercise improve their FEV and FVC, which is similar study was done by Kyo Chul SEO. in 2018. In this study, it was concluded that performing balloon blowing exercises in a 90/90

bridge position with a ball showed significant improvement in respiratory function[17]. The study was also similar to a 2011 study by Sam Cheol et al., which found that balloon blowing exercise was beneficial in boosting respiratory activity[25]. The results of the study were also similar to those of Hun-lo Kim et al. in 2016. Who found that balloon blowing exercise improves respiratory function in elderly smokers[26]. It was also discovered that combining a 90/90 bridge position with balloon blowing exercise improves lung capacity, which is comparable to a study conducted by Yeddu Lakshmi Naryan et al, in 2021 [27]. This study found a positive effect on lung function, which is similar to a 2012 study by Jun-Seop Kim et al., who found that conducting balloon blowing exercises significantly enhanced lung capacity [28]. Sumi Rose and Aakriti Dalal et al. did a study in 2017 that discovered. Individuals who were tr winded to exercise dramatically improved their lung function when in the 90/90 position [29].

According to research done by Yong- Soo kong et al. in 2017[18], the modified cervical exercise is helpful in preventing chronic disease in individuals with forward head position, as well as improving posture and respiratory function. Smartphone users with a forward posture should participate in modified cervical exercise to improve posture and respiratory function, according to 2016 research by Yu-mi Kim et al. The modified cervical exercise can help patients with forward head posture increase their range of motion, according to a study published in 2020 by Shery-ahhiraio et al. [30]. Guner Cicek et al. reported in a study published in 2018 that core strength exercise improves pulmonary function [15]. In 2015, Jwa jun kim et al. conducted a study that found Swiss ball exercise to be useful in improving respiratory function [30].

In a previous study, the effects of balloon blowing exercise, modified cervical exercise, and Swiss ball exercise on lung capacity were demonstrated. However, in this study, the effects of both interventions are compared, which has never been done before, apparently in this study the balloon blowing exercise is more effective in enhancing lung capacity (FEV and FVC) than the typical exercise of modified cervical exercise with Swiss ball.

Conclusion

The purpose of this research was to examine the effects of balloon exercises, modified cervical exercises, and Swiss ball workouts on FVC and FEV in people with text neck syndrome. This study involved two groups: the first performed balloon exercises, while the second performed modified cervical exercises along with Swiss ball exercises for four weeks. It was discovered in this study that participants in group 1 who performed balloon exercises had significantly higher FVC and FEV than those in group 2 who performed modified cervical exercises along with Swiss ball exercises. As a result, the balloon exercise group's respiratory capacity has increased.

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