

## The Study to Compare the Effect of Buteyko Breathing Technique and Pursed Lip Breathing in COPD.

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### Abstract

**Introduction:** Chronic Obstructive pulmonary disease (COPD) is characterized by airflow obstruction with breathing-related symptoms such as chronic cough, exertion dyspnoea, expectoration, and wheeze [1]. The Buteyko concept is a system of breathing exercises originally devised in the 1950s by Professor Konstantin Buteyko, a Russian physician and academic personality [2].

**Aim of The Study:** To compare the better Effectiveness of Buteyko Breathing Technique and Pursed Lip Breathing in Chronic Obstructive Pulmonary Disease.

**Methodology:** Fifty (50) subjects clinically diagnosed of chronic obstructive pulmonary disease (COPD). The subjects divided randomly into two groups; Group A (25) and Group B (25). Group A received Buteyko Breathing Technique (BBT) and Group B received Pursed Lip Breathing (PLB) and done for 4 weeks.

**Discussion:** The Buteyko method is a purported method of "retraining" the body's breathing pattern to correct for the presumed chronic hyperventilation and hypocapnea, and thereby treat or cure the body of these medical problems. Buteyko has been found to be effective in management of Asthma [10]. In our study daily Buteyko breathing exercise session of 30 to 35 minutes was given to patients. Progression of the exercise was made as per the exercise manual of Buteyko Institute of Breathing & Health.

**Conclusion:** In the present study both of the techniques are effective but the Buteyko breathing technique found more effective than pursed lip breathing for 4 weeks. There was significant improvement in Pulmonary Function Test in patients with COPD.

**Keywords:** Buteyko breathing technique, Pursed lip breathing, FEV1, FVC, Spiro meter (koko peak pro 6), Stop watch and Tissue paper.

### Introduction

Chronic Obstructive pulmonary disease (COPD) is characterized by airflow obstruction with breathing-related symptoms such as chronic cough, exertion dyspnoea, expectoration, and wheeze. These symptoms may occur in conjunction with

airway hyper responsiveness and may be partially reversible. Although COPD is a nonspecific term referring to a set of conditions that develop progressively as a result of a number of different disease processes, it most commonly refers to chronic bronchitis and emphysema and a subset of patients with asthma. These conditions can be present with or without significant physical impairment [1].

The Buteyko concept is a system of breathing exercises originally devised in the 1950s by Professor Konstantin Buteyko, a Russian physician and academic personality. Following its popularity in Russia, the concept has gradually spread to western countries over the last 20 years, notably Australia and New Zealand and other parts of Europe. The technique offers a complementary method of relieving respiratory symptoms based

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on the voluntary control of breathing, as well as considering the effects of environmental and dietary triggers [2].

Although this technique had been described and recommended in the mid-1950s and beginning of the 1960s, the first studies designed to establish the benefits and physiological effects of PLB were not published until the mid-1960s. Even now-forty years later-there are few studies on PLB in the literature and the factors underlying its efficacy are not well understood. While most studies have focused on patients with COPD, some have found that PLB may be beneficial in certain neuromuscular diseases and exercise-induced asthma [3].

End expiratory lung volume (EELV) represents the point of equilibrium between the forces of elastic recoil of the lungs and the chest wall. A decrease in EELV represents an increase in the elastic recoil of the chest and potentially more energy for inspiration, which may occur passively as a result of the potential energy of the chest wall at the end of expiration [4].

Mueller *et al.* evaluated the effect of PLB on PaO<sub>2</sub>, PaCO<sub>2</sub> and oxygen saturation (SaO<sub>2</sub>) in COPD patients at rest and during exercise. At rest, they found a significant increase in PaO<sub>2</sub> and SaO<sub>2</sub> and a significant decrease in PaCO<sub>2</sub>; the results were the same for all patients, whether or not they perceived benefits from the PLB [5-7].

### *Need of The Study*

Buteyko Breathing and Pursed Lip Breathing has been defined as a potent method to improve exercise capacity hence and quality of life.

### *Aim of the Study*

To compare the better Effectiveness of Buteyko Breathing Technique and Pursed Lip Breathing in Chronic Obstructive Pulmonary Disease.

### **Hypothesis**

#### *Null Hypothesis*

There will be no significant effect of Buteyko Breathing Technique and Pursed Lip Breathing in Chronic Obstructive Pulmonary Disease.

#### *Alternative Hypothesis*

There would be significant effect of the Buteyko Breathing Technique or Pursed Lip Breathing in Chronic Obstructive Pulmonary Disease.

### **Review of Literature**

Tang C, Taylor N *et al.* conducted a study to examine the effectiveness of chest physiotherapy for patients admitted to hospital with an acute exacerbation of chronic obstructive pulmonary disease (COPD). Chest physiotherapy techniques such as intermittent positive pressure ventilation and positive expiratory pressure may benefit patients with COPD requiring assistance with sputum clearance, while walking programmes may have wider benefits for patients admitted with an exacerbation of COPD. Chest physiotherapy techniques other than percussion are safe for administration to this patient population [12].

Hogg JC, Chu F, Utokaparch S, *et al.* This studied evolution of the pathological effects of airway obstruction in patients with COPD. The small airways were assessed in surgically resected lung tissue from 159 patients – 39 with stage 0 (at risk), 39 with stage 1, 22 with stage 2, 16 with stage 3, and 43 with stage 4 (very severe) COPD, according to the classification of the Global Initiative for Chronic Obstructive Lung Disease (GOLD). Progression of COPD is associated with the accumulation of inflammatory mucous exudates in the lumen and infiltration of the wall by innate and adaptive inflammatory immune cells that form lymphoid follicles. These changes are coupled to a repair or remodeling process that thickens the walls of this airways [17].

CM Parker, N. Voduc, SD Aaron, KA Webb *et al.* This study is conducted on "Physiological changes during symptom recovery from moderate exacerbations of COPD" and concluded that moderate acute exacerbation of chronic obstructive pulmonary disease is characterized by worsening airflow obstruction and lung hyperinflation. Improvement of dyspnea was associated with reduction in lung hyperinflation and consequent increase in expiratory flow rates [18].

J Cross, F Elender, G Barton *et al.* Conducted study to estimate the effect, if any, of Manual Chest Physiotherapy (MCP) administered to patients hospitalized with COPD exacerbation on both disease-specific and generic health-related quality of life. To compare the health service costs for those who either receive or do not receive MCP while in hospital imputed ITT and PP results were similar. No significant differences were observed in any of the outcome measures or subgroup analyses [19].

Elisabeth Ståhl, Anne Lindberg *et al.* This study to evaluate the association between health-related quality of life (HRQL) and disease severity using

lung function measures. The results showed that HRQL in COPD deteriorates with disease severity and with age. These data show a relationship between HRQL and disease severity obtained by lung function [20].

## Research Methodology

### Sampling Technique

Fifty subjects clinically diagnosed of chronic obstructive pulmonary disease (COPD). All the subjects considered for the study was done in SGRRIMHS/SMIH department of physiotherapy at Patel Nagar Dehradun. These subjects were then randomly assigned into two groups of fifty (50) subjects each namely Group A (25) and Group B (25). All the participants took part in the experiments on a voluntary basis after signing a consent form and a demographic data was collected from each subject. The purpose of the study was explained to all the subjects. The subjects were selected according to inclusion and exclusion criteria.

*Inclusion criteria:* Informed consent, Age group 40-65 yrs, Clinical diagnosis of COPD confirmed by smoking history, physical examination and PFT showing irreversible airflow limitation, Patients who are taking bronchodilators., Males and females referral established COPD.

*Exclusion criteria:* Musculoskeletal problems limiting mobility, Rapid intensifying or unstable Angina, Intermittent Claudication, Neurological problems limiting cognition/mobility, Resting O<sub>2</sub> saturation <90% with room air breathing and Patient with viral infection.

*Instrumentation:* Spiro meter (koko peak pro 6), Stop watch and Tissue paper.

### Procedure

Fifty (50) subjects clinically diagnosed of chronic obstructive pulmonary disease (COPD) were selected according to inclusion and exclusion criteria and divided randomly into two groups; Group A (25) and Group B (25). Group A received. Buteyko Berthing Technique (BBT) and Group B received Pursed Lip Breathing (PLB) and done for 4 weeks.

### Buteyko Breathing Technique

At the starting of the session the subject should have an empty stomach and sit in a chair in comfortable position. Pulmonary function test was monitored after sitting and relaxing for about 5

minutes.

Patients were asked to nod head backwards and forwards slowly and coordinate thenodding movement with breathing. Breathe in smoothly, gently and as quietly as possible as head goes back and out as head comes forwards.

Pulse was measured with resting two fingers about one centimeter below the wrist-in line with the thumb-side of the hand. Patient was asked to take in a normal sized breath in and out through nose. Nose is held gently.

Stopwatch was used to keep track of time until patient felt the first onset of a feeling of lack of air. Nose was released, breathing in gently through nose and stopping the stopwatch. Time of Control Pause was noted.

Control pause was followed by relaxed breathing and this was continued for 3mins followed by short rest duration of 30 sec [22].

Post exercise control pause (final control pause) was measured. Post exercise pulse was measured.

The above mentioned protocol was followed for 3 times in a day for 4 weeks.

After the exercises the pulmonary function test and dyspnoea scale and ADL readings are measured. [Fig. 1]



Fig. 1: Patient performing buteyko breathing exercise

### Pursed Lip Breathing

At the starting of the session the subject should have an empty stomach and sit in a chair in comfortable position. Pulmonary function test was monitored after sitting and relaxing for about 5 minutes. Patients were asked to relax the neck and shoulder muscles.

Breathe in (inhale) slowly through nose for two counts, keeping your mouth closed. Don't take a deep breath; a normal breath will do. It may help to count to inhale, one and two.

Pucker or "purse" lips as if a patients were going

to whistle or gently flicker the flame of a candle. Breathe out (exhale) slowly and gently through your pursed lips while counting to four. It may help to count and exhale, one, two, three, four [21].

The above mentioned protocol was followed for 3 times in a day for 4 weeks.

After the exercises the pulmonary function test and dyspnoea scale and ADL readings are measured.

### *Procedure*

#### *Phase I - Pre exercise Phase (5mins)*

Patients were advised to have an empty stomach, and sit in a chair in comfortable position with spine erect.

*Step 1:* Patients were asked to nod head backwards and forwards slowly and coordinate thenodding movement with breathing. Breathe in smoothly, gently and as quietly as possible as head goes back and out as head comes forwards.

*Step 2:* Pulse was measured with resting two fingers about one centimeter below the wrist-in line with the thumb-side of the hand.

#### *Phase II - Exercise Phase (20mins)*

*Step 1:* To measure Control Pause - Patient was asked to take in a normal sized breath in and out through nose. Nose is held gently.

Stopwatch was used to keep track of time until patient felt the first onset of a feeling of lack of air.

Nose was released, breathing in gently through nose and stopping the stopwatch.

Time of Control Pause was noted.

*Step 2:* Control pause was followed by relaxed breathing and this was continued for 3mins followed by short rest duration of 30 sec.

*Step 3:* Same as above was repeated four times followed by a long rest duration of 2mins.

#### *Phase III Post exercise Phase (5mins)*

*Step 1:* Post exercise control pause (final control

pause) was measured.

*Step 2:* Post exercise pulse was measured. (Patient was advised to practice sets before breakfast, before lunch or dinner and before sleep and to note down the readings in daily log.)

The above mentioned protocol was followed in first week of the study. Second week was conducted following the same steps with key aim to become accustomed to a slight feeling of "air hunger" lasting several minutes. One way to do this was using the Extended Pause exercise - which introduces the concept of increasing air hunger. Patients were asked to hold breath a little longer than is comfortable. The last weeks of practice included learning how to fine-tune breathing to the point where patient were hardly breathing at all when practicing the exercises. In weeks 3-4, a further stage of Reduced Breathing was used called "Very Reduced Breathing". It included practicing reduced Breathing with hands on upper and lower chest and allowing patient to breath to reduce to less than normal volume settle into this pattern.

Post exercise values were measured after completion of 4 week [Fig. 2 & 3].



**Fig. 2:** Patient performing post exercise



Fig. 3: Patient performing Spirometer

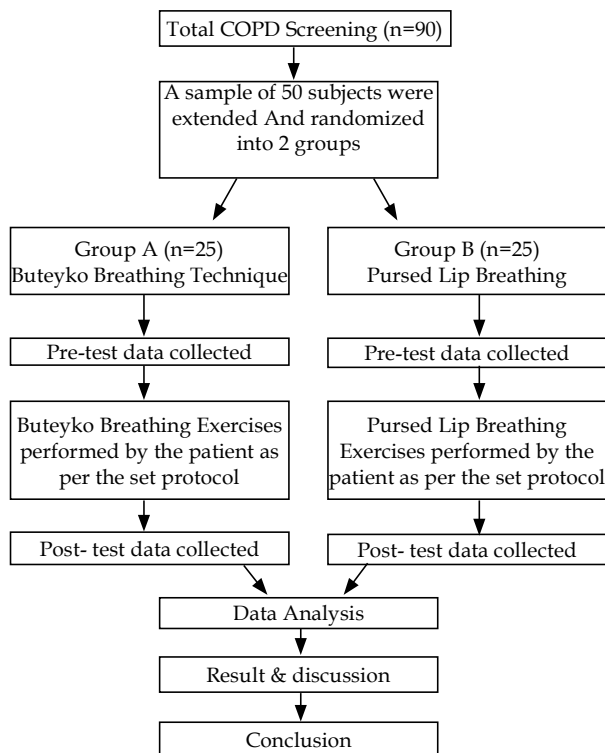


Chart 1: Procedure Chart

**Data Analysis**

Statistics were performed by using SPSS 16. Results were calculated by using 0.05 level of significance. In the present study 50 mild stage COPD patients were taken with homogeneous demographic data consisting of age and ratio of FEV1/FVC which shows no statistical difference. They were divided into two groups by simple random sampling. Group A performed Buteyko Breathing Exercise and Group B performed Pursed Lip Breathing Exercise. Their pulmonary function test and dyspnoea grade were recorded before and after the exercises. The exercise protocol followed every day for 4 weeks and exercise done 3 times in a day. Data was analysed and the results concluded that the exercise

assigned to both the groups was effective in showing significant reduction in both FEV1 and FVC and in the grade of dyspnoea. Reduction in Group A and Group B. Which was obviously but the mean difference values, but the exercises given to Group A (Buteyko Breathing Technique Exercise) showed much significant improvement in FEV1 and FVC and in the dyspnoea grade providing comparison study which state that Buteyko breathing exercise is more effective than Pursed lip breathing exercise.

**Results**

**Demographic Data**

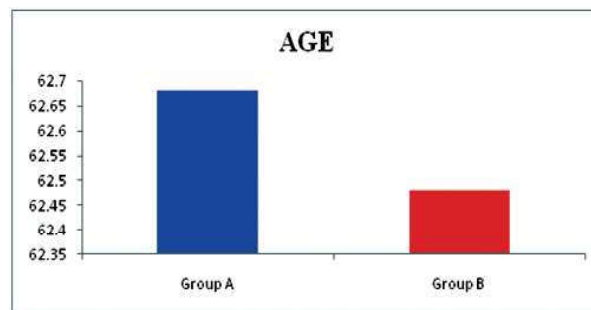
The general characteristics like age and height showed homogeneity and there was no significant difference statistically.

*Age*

Comparison of age of Group A and Group B showed a Mean ± SD of 62.68 ± 0 and 62.48 ± 2.12 respectively [Table 1 & Graph 1].

Table 1: Mean and SD of age between Group A Group B

Age	N	Mean	SD
Group A	25	62.68	0
Group B	25	62.48	2.12



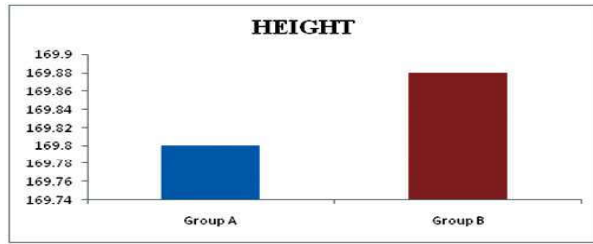
Graph 1: Mean of age between Group A Group B

*Height*

Comparison of height of Group A and Group B showed a Mean ± SD of 169.8 ± 19.09 and 169.88 ± 3.54 respectively [Table 2 & Graph 2].

Table 2: Mean and SD of height between Group A and Group B

Height	N	Mean	SD
Group A	25	169.8	19.09
Group B	25	169.88	3.54



Graph 2: Mean of height between Group A and Group B

**Within Group Analysis**

*Data of Group A (Buteyko Breathing Technique)*

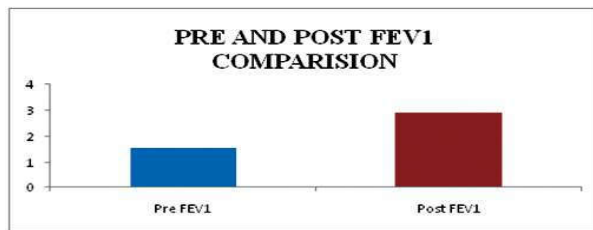
When data was compared within group, analysis for Group A showed following result.

**FEV1**

Comparison of pre and post FEV1 values within Group A showed a Mean ± SD of pre FEV1 is 1.59 ± 1.11 and Mean ± SD of post FEV1 is 2.90 ± 1.27 respectively. With t-value and p-value of which is significant. [Table 3 & Graph 3]

Table 3: Comparison of mean and SD values of pre and post FEV1 within Group A

FEV1	N	Mean	SD	t-value	p-value
Pre FEV1	25	1.59	1.11	4.0	0.01
Post FEV1	25	2.90	1.27		



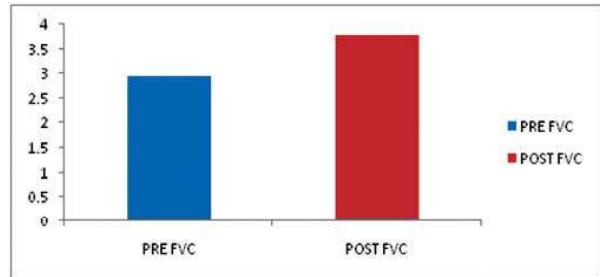
Graph 3: Comparison of mean values of pre and post FEV1 within Group A

**FVC**

Comparison of pre and post FVC values within Group A showed a Mean ± SD of pre FVC is 2.95 ± 1.75 and Mean ± SD of post FVC is 3.78 ± 1.34 respectively. With t-value and p-value of which is significant. [Table 4 & Graph 4]

Table 4: Comparison of mean and SD values of pre and post FVC within Group A

FVC	N	Mean	SD	t-value	p-value
Pre FVC	25	2.95	1.75	1.53	0.01
Post FVC	25	3.78	1.34		



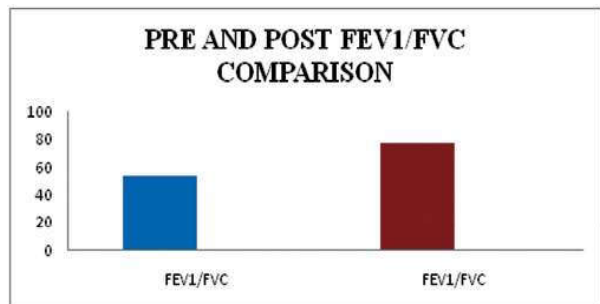
Graph 4: Comparison of mean values of pre and post FVC within Group A

**FEV1/FVC**

Comparison of pre and post FEV1/ FVC values within Group A showed a Mean ± SD of pre FEV1/FVC is 53.94 ± 5.50 and Mean ± SD of post FEV1/FVC is 76.83 ± 6.44 respectively. With t-value and p-value of which is significant. [Table 5 & Graph 5].

Table 5: Comparison of mean and SD values of pre and post FEV1/FVC within Group A

FEV1/FVC	N	Mean	SD	t-value	p-value
Pre FEV1/FVC	25	53.94	5.50	13.54	0.01
Post FEV1/FVC	25	76.83	6.44		



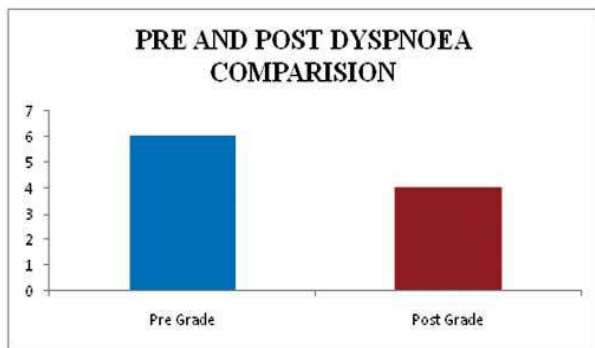
Graph 5: Comparison of mean values of pre and post FEV1/FVC within Group A

**Borg Scale**

Comparison of pre and post dyspnoea grades within Group A showed a Mean ± SD of dyspnoea grade is 6.04 ± 0.71 and Mean ± SD of post dyspnoea grade is 4.05 ± 0.60 respectively. With t-value and p-value of which is significant [Table 6 & Graph 6].

Table 6: Comparison of mean and SD values of pre and post dyspnoea grades within Group A

BORG SCALE	N	Mean	SD	t-value	p-value
Pre Grade	25	6.04	0.71	11.75	0.01
Post Grade	25	4.05	0.60		



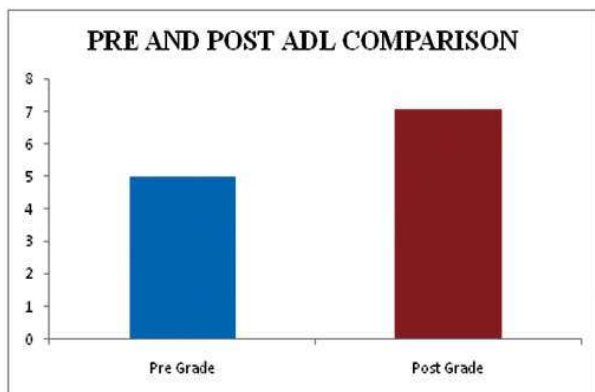
**Graph 6:** Comparison of mean values of pre and post dyspnoea grades within Group A

*ADL Scale*

Comparison of pre and post grades within Group A showed a Mean ± SD of grade is 5 ± 1.48 and Mean ± SD of post grade is 7.08 ± 2.25 respectively. With t-value and p-value of which is significant. [Table 7 & Graph 7].

**Table 7:** Comparison of mean and SD values of pre and post ADL Scale within Group A

ADL SCALE	N	Mean	SD	t-value	p-value
Pre Grade	25	5	1.48	3.85	0.01
Post Grade	25	7.08	2.25		



**Graph 7:** Comparison of mean values of pre and post ADL Scale within Group A

*Data of Group B (Pursed Lip Breathing Exercise)*

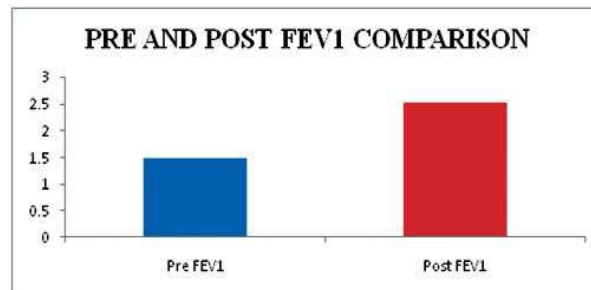
When data was compared within group, analysis for Group B showed following result.

*FEV<sup>1</sup>*

Comparison of pre and post FEV1 values within Group B showed a Mean ± SD of pre FEV1 is 1.49 ± 0.22 and Mean ± SD of post FEV1 is 2.52 ± 0.32 respectively. With t-value and p-value of which is significant. [Table 8 & Graph 8].

**Table 8:** Comparison of mean and SD values of pre and post FEV1 within Group B

FEV1	N	Mean	SD	t-value	p-value
Pre FEV1	25	1.49	0.22	0.2	0.01
Post FEV1	25	2.52	0.32		



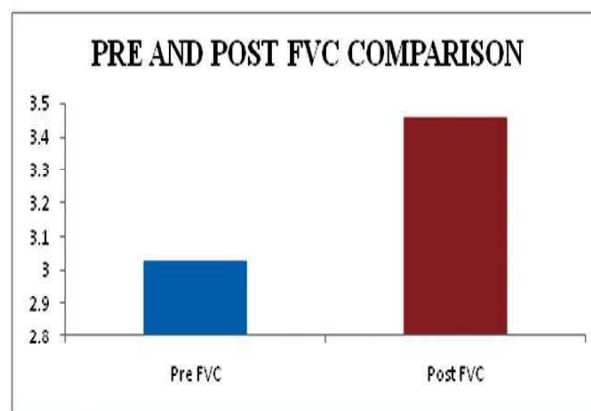
**Graph 8:** Comparison of mean values of pre and post FEV1 within Group B

*FVC*

Comparison of pre and post FVC values within Group B showed a Mean ± SD of pre FVC is 3.03 ± 0.07 and Mean ± SD of post FVC is 3.46 ± 0.42 respectively. With t-value and p-value of which is significant. [Table 9 & Graph 9]

**Table 9:** Comparison of mean and SD values of pre and post FVC within Group B

FVC	N	Mean	SD	t-value	p-value
Pre FVC	25	3.03	0.07	0	0.01
Post FVC	25	3.46	0.42		



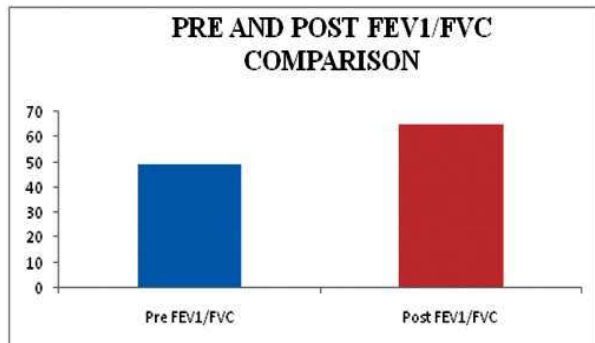
**Graph 9:** Comparison of mean values of pre and post FVC within Group B

*FEV<sup>1</sup>/FVC*

Comparison of pre and post FEV1/ FVC values within Group B showed a Mean ± SD of pre FEV1/ FVC is 49.37 ± 7.50 and Mean ± SD of post FEV1/ FVC is 65.26 ± 1.02 respectively. With t-value and p-value of which is significant. [Table 10 & Graph 10].

**Table 10:** Comparison of mean and SD values of pre and post FEV1/FVC within Group B

FEV1/FVC	N	Mean	SD	t-value	p-value
Pre FEV1/ FVC	25	49.37	7.50	10.5	0.01
Post FEV1/FVC	25	65.26	1.02		



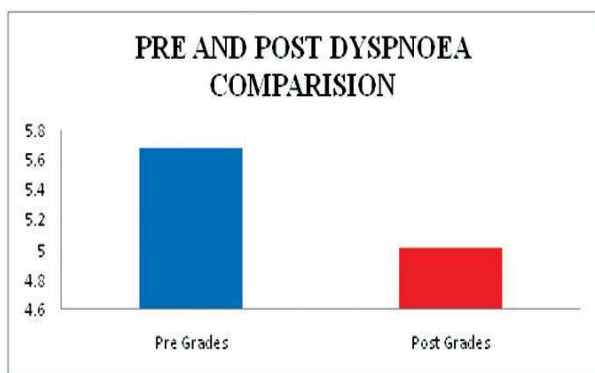
**Graph 10:** Comparison of mean of pre and post FEV1/FVC within Group B

*Borg Scale*

Comparison of pre and post grades within Group B showed a Mean ± SD of dyspnoea grade is 5.68 ± 0.55 and Mean ± SD of post dyspnoea grade is 5.02 ± 0.51 respectively. With t-value and p-value of which is significant. [Table 11 & Graph 11]

**Table 11:** Comparison of mean and SD values of pre and post dyspnoea grades within Group B

BORG SCALE	N	Mean	SD	t-value	p-value
Pre Grade	25	5.68	0.55	4.7	0.01
Post Grade	25	5.02	0.51		



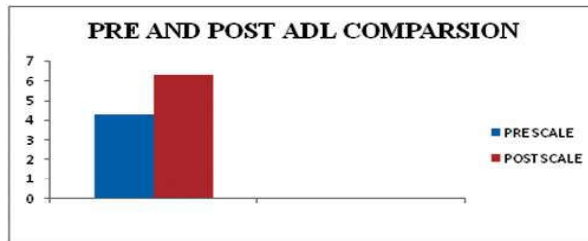
**Graph 11:** Comparison of mean values of pre and post dyspnoea grades within Group B

*ADL Scale*

Comparison of pre and post ADL scale within Group B showed a Mean±SD of grade is 4.28±0.71 and Mean±SD of post ADL scale is 6.32±1.41 respectively. With t-value and p-value of which is significant. [Table 12 & Graph 12]

**Table 12:** Comparison of mean and SD values of pre and post ADL Scale within Group B

ADL SCALE	N	Mean	SD	t-value	p-value
Pre Grade	25	4.28	0.71	5.51	0.01
Post Grade	25	6.32	1.41		



**Graph 12:** Comparison of mean values of pre and post ADL Scale within Group B

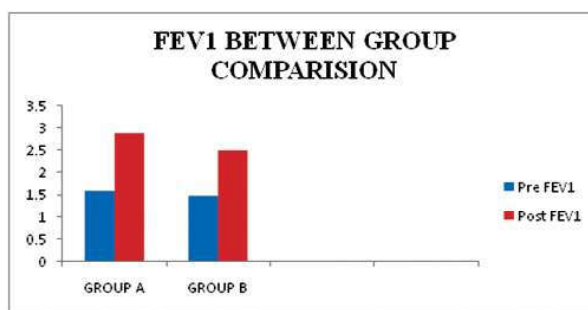
*Between Group Comparison*

*FEV<sup>1</sup>*

Comparing Mean and SD of pre FEV1 and post FEV1 between Group A and Group B. Mean ± SD of pre FEV1 of Group A is 1.59 ± 1.11 and post FEV1 of Group A is 2.90 ± 1.27 with a t-value of 4.0. Mean ± SD of pre FEV1 of Group B is 1.49 ± 0.22 and post FEV1 of Group B is 2.52 ± 0.32 with a t-value of 0.2. [Table 13 & Graph 13]

**Table 13:** Mean and SD of pre FEV1 and post FEV1 for Group A and Group B

FEV1	Group A		Group B	
	Mean	SD	Mean	SD
Pre FEV1	1.59	1.11	1.49	0.22
Post FEV1	2.90	1.27	2.52	0.32



**Graph 13:** Mean pre FEV1 and post FEV1 for Group A and Group B

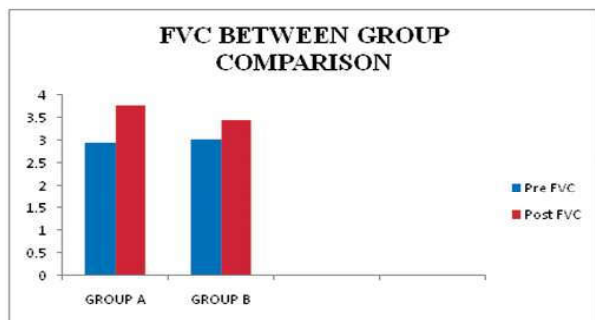
*FVC*

Comparing Mean and SD of pre FVC and post FVC between Group A and Group B. Mean ± SD of pre FVC of Group A is 2.95 ± 1.75 and post FVC of Group A is 3.78 ± 1.34 with a t-value of 1.53. Mean ± SD of pre FVC of Group B is 3.03 ± 0.07 and post FVC of Group B is 3.46 ± 0.42 with a t-value of 0. [Table 14 & Graph 14]



**Table 14:** Mean and SD of pre FVC and post FVC for Group A and Group B

FVC	Group A		Group B	
	Mean	SD	Mean	SD
Pre FVC	2.95	1.75	3.03	0.07
Post FVC	3.78	1.34	3.46	0.42



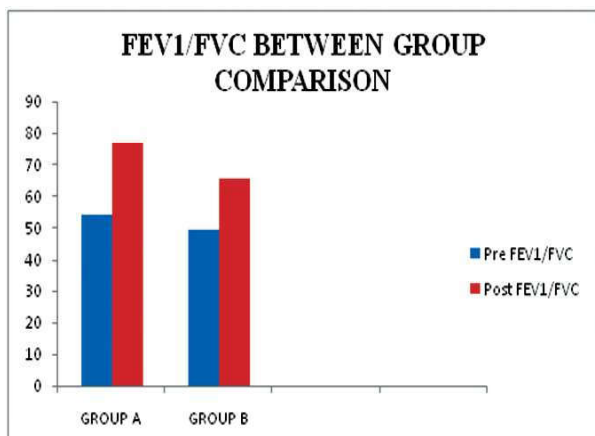
**Graph 14:** Mean of pre FVC and post FVC for Group A and Group B

*FEV1/FVC*

Comparing Mean and SD of pre FEV1/FVC and post FEV1/FVC between Group A and Group B. Mean  $\pm$  SD of pre FEV1/FVC of Group A is  $53.94 \pm 5.50$  and post FEV1/FVC of Group A is  $76.83 \pm 6.44$  with a t-value of 13.54. Mean  $\pm$  SD of pre FEV1/FVC of Group B is  $49.37 \pm 7.50$  and post FEV1/FVC of Group B is  $65.26 \pm 1.02$  with a t-value of 10.5. [Table 15 & Graph 15]

**Table 15:** Mean and SD of pre FEV1/ FVC and post FEV1/FVC for Group A and Group B

FEV1/FVC	Group A		Group B	
	Mean	SD	Mean	SD
Pre FEV1/FVC	53.94	5.50	49.37	7.50
Post FEV1/FVC	76.83	6.44	65.26	1.02



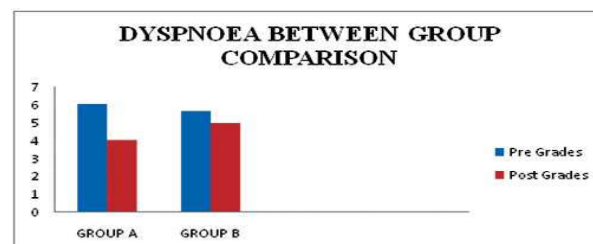
**Graph 15:** Mean of pre FEV1/ FVC and post FEV1/FVC for Group A and Group B

*Borg Scale*

Comparing Mean and SD of pre dyspnoea grade and post dyspnoea grade between Group A and Group B. Mean  $\pm$  SD of pre dyspnoea grade of Group A is  $6.04 \pm 0.71$  and post dyspnoea grade of Group A is  $4.05 \pm 0.60$  with a t-value of 11.75. Mean  $\pm$  SD of pre dyspnoea grade of Group B is  $5.68 \pm 0.55$  and post dyspnoea grade of Group B is  $5.02 \pm 0.51$  with a t-value of 4.7. [Table 16 & Graph 16].

**Table 16:** Mean and SD of pre dyspnoea grade and post dyspnoea grade for Group A and Group B

DYSPNOEA	Group A		Group B	
	Mean	SD	Mean	SD
Pre Grades	6.04	0.71	5.68	0.55
Post Grades	4.05	0.60	5.02	0.51



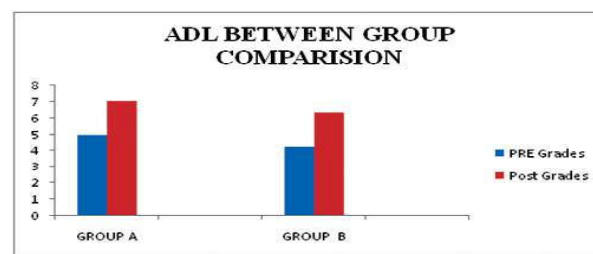
**Graph 16:** Mean pre dyspnoea grade and post dyspnoea grade for Group A and Group

*ADL Scale*

Comparing Mean and SD of pre ADL scale and post ADL scale between Group A and Group B. Mean  $\pm$  SD of pre ADL scale of Group A is  $5 \pm 1.48$  and post ADL scale of Group A is  $7.08 \pm 2.25$  with a t-value of 3.85. Mean  $\pm$  SD of pre ADL scale of Group B is  $4.28 \pm 0.71$  and post ADL scale of Group B is  $6.32 \pm 1.41$  with a t-value of 5.51. [Table 17 & Graph 17].

**Table 17:** Mean and SD of pre ADL scale and ADL scale for Group A and Group B

ADL Scale	Group A		Group B	
	Mean	SD	Mean	SD
Pre Grades	5	1.48	4.28	0.71
Post Grades	7.08	2.25	6.32	1.41



**Graph 17:** Mean and SD of pre ADL scale and ADL scale for Group A and Group B

## Discussion

As per the previous studies both of the techniques are used for COPD patients and both are effective but in this study we find that Buteyko breathing exercises are more effective and better than pursed lip breathing exercise. All the subjects underwent spirometric evaluation for FVC, FEV1. Subjects were demonstrated the steps and technique of Buteyko Breathing Exercise and Pursed Lip Breathing.

Advocates of this method believe that the effects of chronic hyperventilation has effects which include bronchospasm disturbance of cell energy production via krebs cycle, as well disturbance of numerous vital homeostatic chemical reactions in the body [9].

The Buteyko method is a purported method of "retraining" the body's breathing pattern to correct for the presumed chronic hyperventilation and hypocapnea, and thereby treat or cure the body of these medical problems. Buteyko has been found to be effective in management of Asthma [10].

The quality of evidence of the Buteyko Method according to an Australian Department of Health report is stronger than any other complementary medicine treatment of asthma [11].

There are now new definitions for both asthma and COPD that acknowledge the overlap and highlight the similarities and differences between them. Asthma and COPD have important similarities and differences [12] both are chronic inflammatory diseases that involve the small airways and cause airflow limitation [13,14,15,16] both result from gene-environment interactions and both are usually characterised by mucus and bronchoconstriction.

Niraj Kumar, (2018). The present study concluded that group A (Pneumatic Compression Therapy and Lymphatic Drainage Exercises) showed significant improvement as Group B (Manual lymphatic drainage (MLD) and control group (lymphatic drainage exercises) for upper limb in lymphoedema [23].

Taniya Singh, (2019) *et al.* We have shown that there is no significant result between active cycle of breathing technique along with postural drainage and autogenic drainage in clearance of secretions and oxygenation in clinically diagnosed patients with chronic bronchitis. In this study, Active cycle of breathing technique with postural drainage and autogenic drainage are effective individually but comparatively there is no significant difference between 2 groups [24].

## Limitations of the Study

*Sample size in this study was small.*

Only mild stage of COPD was taken as lack of instrumentation for proper screening of the patients.

### *Future Study*

There is a need of research to carry out by taking large sample size.

The age group can be changed with more concern to patients.

Further studies can be done using different variables.

The follow up protocol can be taken more than 4 week.

## Conclusion

In the present study both of the techniques are effective but the Buteyko breathing technique found more effective than pursed lip breathing. There was significant improvement in Pulmonary Function Test in COPD patients through Buteyko breathing exercise than Pursed Lip Breathing for 4 weeks in patients with COPD. There was significant improvement in Dyspnoea post Buteyko breathing exercise than pursed lip breathing for 4 weeks in patients with COPD.

There was also significant improvement in FVC and FEV1 Buteyko breathing exercise for 4 weeks in patients with COPD. There is minimal changes found in activity of daily living rather than dyspnoea and pulmonary function test.

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