

“Effects of Thoracic Maitland Mobilization In COPD Patients On Respiratory Parameters”

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ABSTRACT

Background: Chronic Obstructive Pulmonary (COPD) is characterized by limitation of airflow within the airways. It is can be prevented but it is not reversible. COPD is a progressive disease; its symptoms include dyspnea, cough and sputum. The aim of this study was to see the effect thoracic Maitland mobilization in COPD patients through respiratory parameters. **Methodology:** Ethical approval was obtained from institutional ethical committee. Thirty patients were selected who were suffering from mild to moderate COPD. They were given thoracic mobilization for 3days a week for 4 weeks. For outcome measure Chest expansion, PEFr, BORG scale and Distance on 6MWT was measured. The measurements were taken on 1st day 14th day and 28th day. **Results:** Annova method was used to see the result for 3 readings i.e. on 1st day, 14th day and 28th day. There was seen increase in the chest expansion at 2nd ICS, 4th ICS AND 6th ICS. At 2nd ICS there was increase in expansion(1.47±0.14, 1.24±0.13, 1.36±0.10), at 4th ICS increase was significant (2.1±0.24, 2.22±0.21, 2.34±0.19) , at 6th ICS (3.35±0.20, 3.43±0.18, 3.54±0.19). There was also increase in the PEFr (163.7±26.5, 172.26.1±26.1, 181.8±26.9). There was increase in the 6MWT (355.8±74.8, 389.3±44.3, 407.67±41.6). There was a significant decrease in dyspnea as well (8.81±1.39, 8.70±1.34, 8.05±0.90). **Conclusion:** There was a significant seen of effect of thoracic Maitland mobilization in COPD patients on respiratory parameters.

Keywords: Thoracic Maitland mobilization, Chronic Obstructive Pulmonary Disease, Borg Scale, PEFr, chest expansion.

Introduction:

Chronic Obstructive Pulmonary Disease is a disease which can be prevented but cannot be cured once occurred. COPD is caused by the chronic limitation in the airways in the respiratory tract .COPD is a progressive lung disease; it is characterized by symptoms like acute exacerbation which causes breathlessness/ dyspnea, respiratory distress and cough. COPD can be diagnosed with the help of Spirometry and also on the grades of dyspnea¹.

In COPD the further factors are V/Q mismatch, which may also include shunt, hyperventilation or hypoventilation and may also present with diffusion limitation which may further lead to impairment of gas exchange².

To solve or reduce the dysfunction of the thoracic pump movement, techniques like thoracic mobility exercises or thoracic mobilizations, chest mobilizations and chest PNF techniques can also be given². COPD leads to decreased force strength and endurance of the respiratory muscles as well as deteriorated gait ability.⁵

Mobilization helps in reducing the pain and also helps in increasing the ROM of the treated area it is a gentle technique where the force and amplitude can be controlled depending on the response of the tissues and the severity of the condition being treated. Passive joint mobilization and manipulation would activate mechanoreceptors and may therefore provide pain relief by activating this spinal gate control mechanism. By improving respiratory muscle function or reducing respiratory load the aim is to reduce the relative load on the muscle and hence helps in reducing dyspnea and to increase the maximal sustained ventilatory capacity.²

The 6MWT is a very simple and inexpensive way in cardiopulmonary exercise testing to measure the functional capacity. There is a correlation between the 6MWT and VO₂ max in the patients suffering from COPD and also in patients awaiting lung transplant.¹

Patients suffering with asthma avoid strenuous activity as a strategy to limit the experience of dyspnea which in turn leads to sedentary lifestyle. Studies have shown that the Inspiratory muscles can be trained for increasing the strength and endurance of the muscles in both healthy people as well in people with chronic obstructive pulmonary disease and cystic fibrosis.¹²

MATERIALS AND METHOD:-

An Experimental trial was conducted among the COPD patients. The aim of this study was to see the effect of thoracic spine Maitland mobilization in COPD patients on respiratory parameters. Chest expansion, 6MWT, PEFr and BORG scale were used to see the effect of thoracic mobilization.

Ethical approval was obtained from Institutional Ethical Committee. Total 30 patients were selected for the study using convenient sampling. The patients were explained the process of thoracic mobilization technique and consent was taken. Pre treatment and post treatment assessment were done. The protocol was set for 3 days a week and for 4 weeks. Chest expansion, PEFr, 6MWT and grade of dyspnea were assessed. The patients were reassessed post 2 weeks and 4 weeks. BORG Scale was used for assessing the grade of dyspnea.

Subjects aged between 35-60 both males and females having COPD on GOLD'S CRITERIA I AND II. Patients who were not willing to participate, who had been through recent surgeries of spine,

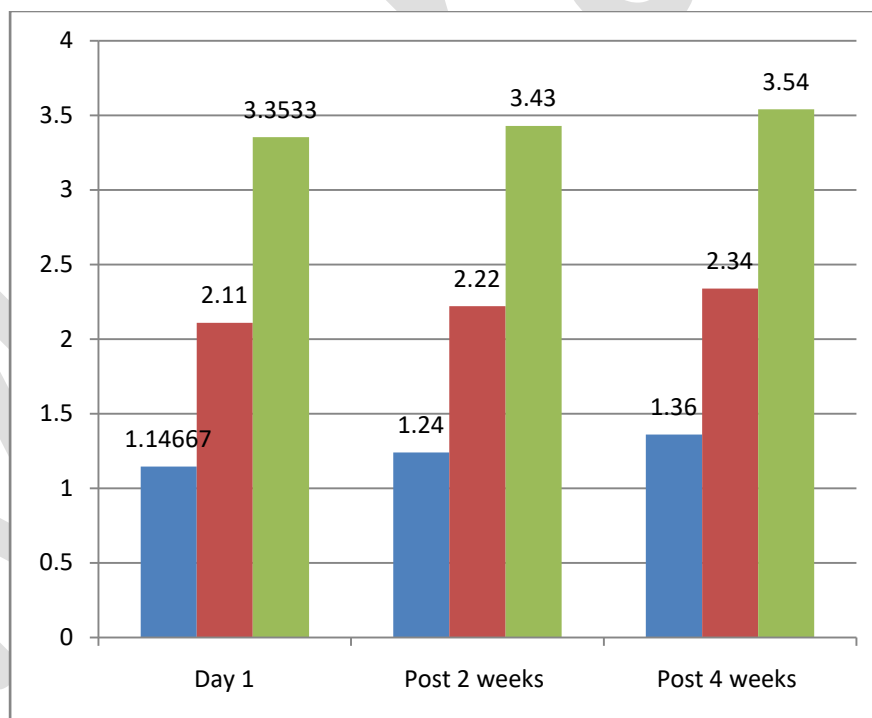
thorax or abdomen, had any form of injuries to spine, thorax and abdomen regions were excluded from the study.

RESULTS:

Graph No. 1 CHEST EXPANSION (in cms):-

Table 1

	Axillary Level (Mean± SD)	Mammary Level (Mean± SD)	Xiphisternum Level (Mean± SD)
1st Day	1.14±0.14	2.1±0.24	2.1±0.24
14th Day	1.24±0.13	2.22±0.21	2.22±0.21
28th Day	1.36±0.10	2.34±0.19	2.34±0.19
p Value	0.0001	0.0001	0.0001

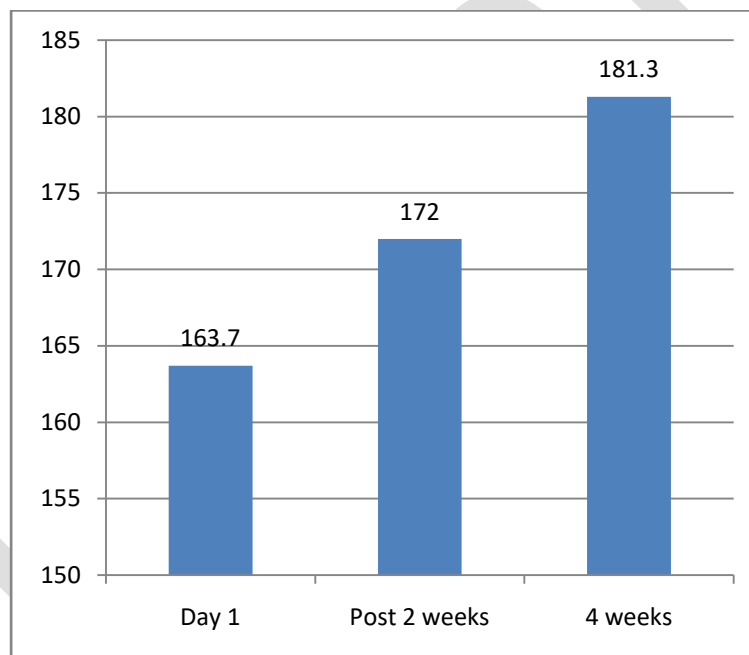


INTERPRETATION: - Graph no.1 shows that pre and post values of chest expansion at 3 levels Axillary level, mammary level and Xiphisternum level with mean values. The pre and post values of Axillary level (1.14±0.14, 1.24±0.13 and 1.36±0.10) with the p value < 0.0001. The pre and post values of mammary level (2.1±0.24, 2.22±0.21 and 2.34±0.19) with p value < 0.0001. The pre and post values of Xiphisternum level (3.35±0.20, 3.43±0.18 and 3.54±0.19) with p value <0.0001.

Graph No 2 PEFR (L/Min):-

Table No.2

	PEFR (L/ Min) Mean ±SD
1st day	163.7 ±26.5
Post 2weeks	172±26.1
Post4 weeks	181.3±26.9
p Value	<0.0001

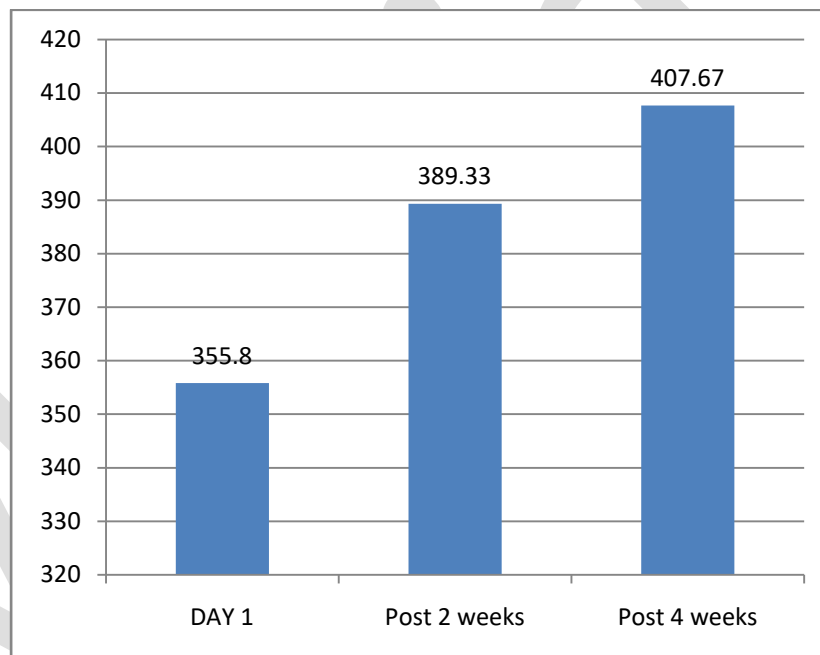


INTERPRETATION: - Graph 2 shows the pre and post mean values of PEFR done on the 1st (163.7±26.5) with p value < 0.0001. Post 2 weeks (172±26.1) with p value <0.0001. The PEFR values post 4 weeks (181.3±26.9) p value <0.0001. As the p value is < 0.0001 it is considered extremely significant.

Graph No 3 SIX MINUTE WALK TEST DISTANCE (in mts):-

Table No.3

	Mean \pm SD
1st day	355.8 \pm 74.8
Post 2weeks	389.3 \pm 44.3
Post 4weeks	407.67 \pm 41.6
p value	<0.0001

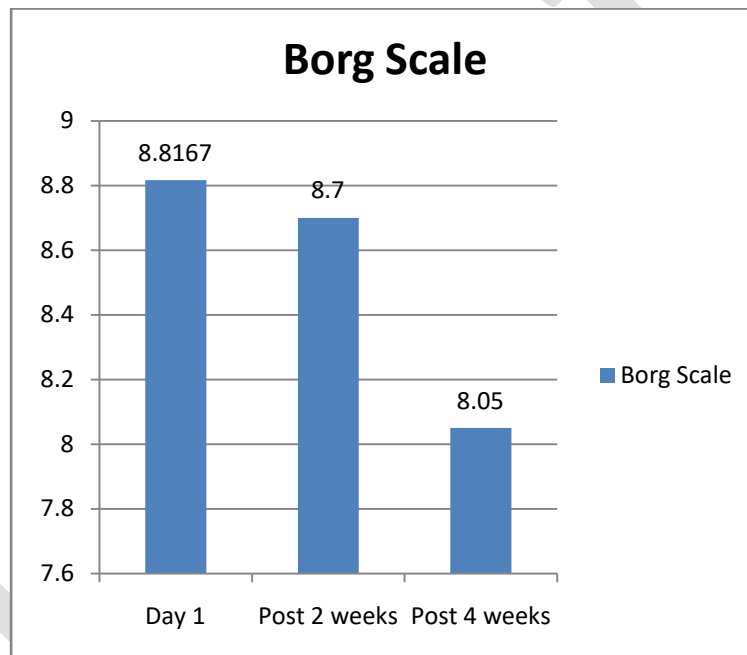


INTERPRETATION: Graph 3 shows the pre and post values of 6MWT on day 1 day 14 and day 21. The graph shows the increase in the average distance of 6MWT after the treatment protocol and on the 1st day of treatment protocol. The value on 1st day (355.8 \pm 74.8) with p value 0.0001, post 2 weeks (389.3 \pm 44.3) p value<0.0001 and post 4 weeks (407.67 \pm 41.6) p value<0.0001. The p value for 6MWT is p<0.0001 which is considered as extremely significant.

Graph No 4 BORG SCALE:-

Table 4

	Mean ±SD
1st day	8.81± 1.39
14th Day	8.70± 1.34
28th Day	8.05± 0.90
p Value	<0.0001



INTERPRETATION: - Graph 4 shows the result of pre and post Borg scale which shows the reduction in the grades of dyspnea. The readings on 1st day (8.81±1.39) post 2 weeks (8.7±1.34) and post 4 weeks (8.05±0.90). The p value for BORG Scale is $p < 0.0001$ which is extremely significant.

DISCUSSION:

The present study was conducted among 30 people suffering from COPD grade I and II on GOLD'S Criteria. The study was conducted in Mumbai. The aim of the study was to assess the effect

of thoracic spine maitland mobilization in COPD patients on respiratory parameters. Both the genders were selected between the age group of 35years to 60years of age.

The total number of people assessed was 40 COPD patients out of which 10 people were the dropouts as 4 people did not co-operate with the treatment protocol and 6 patients did not follow up regularly. The details of all the 30 patients were assessed and note on a data collection sheet and a proper record was kept of their details and the participants were assured that the information gathered was not given to anyone.

There are previous researches done related to joint mobilization in COPD patients which have concluded that there positive effects of joint mobilization in COPD patients. Thoracic spine mobilization helps in the movement of the thoracic cage, as there will be movement of spinal muscles and the intercostal muscles.

There is a previous research on COPD patients which was done by Sonia U Mulay in 2017 which was on Effectiveness of shoulder and thoracic mobility exercises on chest expansion and dyspnea in moderate chronic obstructive pulmonary patients which concluded that shoulder and thoracic mobility exercises were effective in increasing chest expansion and reducing dyspnea in COPD patients.¹

There was a previous research done on COPD patients who had a condition added with COPD like in the article of a JOONG-SANG WANG which was Effect of joint mobilization and stretching on respiratory function and spinal movement in very severe COPD with thoracic kyphosis. This research was done in 2015.⁸

There is significant increase seen in the chest expansion at all the levels (Axillary level, mammary level and at xiphisternum level). The readings of Axillary level value on 1st day, post 2 weeks and post 4 weeks were (1.17±0.14, 1.24±0.13 and 1.36±0.10) respectively with p value 0.0001. The values at Mammary level on 1st day post 2 weeks and 4weeks are (2.1±0.24, 2.22±0.21 and 2.34±0.19) respectively with p value <0.0001. The pre and post values at Xiphisternum levels are (3.35±0.20, 3.34±0.18 and 3.54±0.19) with p value<0.0001.

Graph 2 shows the mean values of PEFr measured on the 1st day, post 2 weeks and post 4 weeks (163.7±26.5, 172±26.1 and 181.3±26.9) respectively. The p value for pre and post values for PEFr is p value <0.0001 which is considered extremely significant.

Graph 3 shows the pre and post values of 6MWTd. The graph shows the increase in the average distance of 6MWTd after the treatment protocol and on the 1st day of treatment protocol. The value

on 1st day (355.8±74.8) with p value 0.0001, post 2 weeks (389.3±44.3) p value<0.0001 and post 4 weeks (407.67±41.6) p value<0.0001 The p value for 6MWT is p<0.0001 which is considered as extremely significant.

Graph 4 shows the result of pre and post Borg scale which shows the reduction in the grades of dyspnea. The readings on 1st day, post 2weeks and post 4weeks are (8.81±1.39, 8.7±1.34, and 8.05±0.90). The p value for BORG Scale is p< 0.0001 which is extremely significant.

Graph 5 shows the number of people suffering from COPD since months or years. 2months – 1year: - 4 participants, 12 participants of 1.1 -3 years, 12 participants of 3.1-5years and 2 participants are suffering from COPD since 5.1- 8 years.

CONCLUSION:-

The study on effect of thoracic spine Maitland mobilization on COPD patients in respiratory parameters concludes that there has been a positive effect of maitland mobilizations on chest expansion at all 3 levels, increase in the PEFV values, there was also increase in the 6MWT and reduction in the grades of dyspnea which is one of the symptoms of COPD.

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