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RESEARCH ARTICLE

STUDY OF THE IMMEDIATE EFFECT OF FOAM ROLLER STRETCH ON CHEST EXPANSION

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ABSTRACT

Background: Chest expansion is the important tool to determine the patient's status and the respiratory function. The stretching technique performed on foam roller (self-myofascial release) helps in lengthening the muscles by releasing its tightness and soreness and hence enhances the chest expansion. This study concentrates on the immediate effect of foam roller stretch on chest expansion. **Objectives:** The purpose of this study is to determine the immediate effect of foam roller stretch on chest expansion. **Methods:** Cross- sectional study of 50 convenient sampling based on gender distribution. **Results:** The results were obtained using foam roller and individual chest expansion. Statistical analysis shows that there is significant increase in upper level (p=0.000), middle level (p=0.000) and lower level (p=0.000) in the thoracic region. **Conclusions:** There is significant increase in chest expansion after foam roller stretch.

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INTRODUCTION

Thoracic mobility is the movement of the thoracic spine which plays a major role in improving the posture by improving the thoracic extension and rotation. Decrease in thoracic mobility decreases the range of motion of shoulder movements, reduces the chest expansions and causes difficulty in normal respiration. Any pathological conditions in the lungs or thoracic cage and neck pain population can reduce the thoracic movement. Effective lung expansion and subsequent ventilation is required for the normal chest wall mobility. [(1)] Foam roller is the light weighted, cylindrical tube of compressed foam that is mainly used to relieve the soreness and tightness of the muscles. Self-myofascial release is done by using this device called foam roller. It can be both used for rehabilitation and fitness purposes in order to enhance myofascial mobility. It helps to increase the joint range of motion [(2)], delayed onset muscle soreness (DOMS) [(3)] and also enhances the recovery period. With the help of foam roller, patients can relieve their pain and tightness by rolling over the device along with some thoracic mobility exercises. Hence, helps to increase the chest expansion.

The foam is available in two sizes. Standard size of (6inch*36inch) and half size (6inch*18inch) [(4)]. Pressure is produced by the rolling action by upper extremities on performing thoracic mobility actions on foam roller. [(5)] Chest expansion measurement is the important tool to assess the thoracic muscle length. It is used to determine the patient's status, effectiveness of the treatment and also the function of the respiratory system. The procedure is done by using measuring tape in three different levels of the chest.

Upper chest: below axilla at the middle of the sternum.

Middle chest: across the nipple line.

Lower chest: xiphisternum. The chest movement can be felt and known by palpation and also by observation. The movement of the ribcage and chest expansion is associated with the movement of thoracic rib cage.[(6)] But underlying pathological conditionscan resist the chest expansions which can be treated with surgical, medical and therapeutic interventions.

So, measuring tape can help to find out the decreased chest expansion as in respiratory disease. It is done by full inspiration followed by full expiration. [6-7]

METHODOLOGY

Study Design: Cross Sectional Study

Place of Study: DR. B.R. Ambedkar Medical college

Sampling Technique: Convenient sampling

Study Sample: 50 subjects

Inclusion criteria:

- Age group of 18 to 24 years
- Both male and female
- Individuals willing to participate

Exclusion criteria

- Individuals with history of or known respiratory diseases.
- Individuals with recent upper limb, rib cage or spine fracture.

Outcome Measures

- Chest expansion

MATERIALS USED IN THE STUDY:

- Pen
- Paper
- Measuring tape
- Foam roller
- Plinth

RESULTS

A total of 50 young healthy adults formed the study population. Descriptive statistics was used to find out the frequency, percentage, mean, standard deviation from the demographic data and variables studied. The age group selected ranges from 18-24 years.

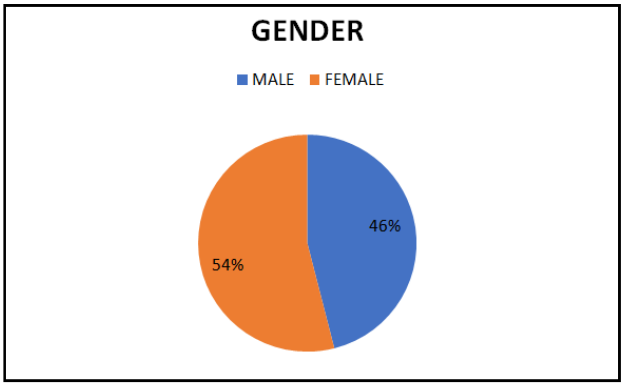
Table 1. Distribution of units on the basis of GENDER

GENDER	FREQUENCY	PERCENTAGE
MALE	23	46%
FEMALE	27	54%
TOTAL	50	100%

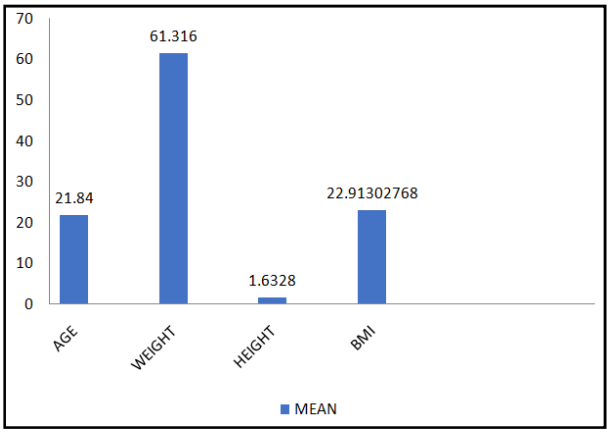
Table-1 shows out of 50 subjects, 23(46%) were male and 27(54%) were female.

DISCUSSION

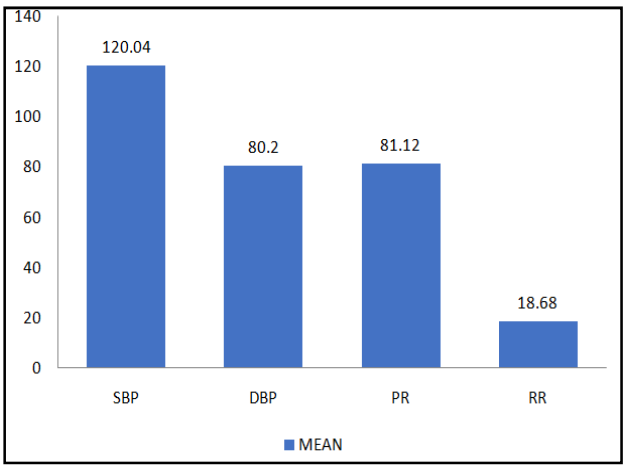
Table 1 and graph1 shows that out of 50 subjects, 23 (46%) were male and 27(54%) were female. Table 2 and graph 2, graph 3 shows the mean age of 21.8400, mean weight of 61.3160, mean height of 1.6328, mean BMI of 22.9130, mean SB of 120.0400, mean DB of 80.2000, mean PR of 81.1200 and mean RR of 18.6800.



Graph1. Graph showing distribution of units on the basis of gender



Graph 2. Showing mean of age, weight, height, BMI



Graph 3. Showing mean of SBP, DBP, PR and RR

Table 3 and graph 4 shows the mean and standard deviation of pre and post foam roller stretch at upper level, middle level and lower level. The chest expansion reading before the treatment in upper level is 4.03±1.179 post treatment it increased to 5.8±1.224.The chest expansion reading before the treatment in middle level is 3.24±1.325 post treatment it increased to 4.5±1.613.The chest expansion reading before the treatment in lower level is 4.15±1.217 post treatment it increased to 5.66±1.303. Table 4 and graph 5 shows the mean of average improvement in upper level, middle level and lower level after foam roller stretch. Pre post comparison in upper level has an average improvement of 1.77(p value=0.000), Middle level has average improvement of 1.26(p value=0.000) and lower level has an improvement of 1.51(p value= 0.000) which are statistically significant.

Table 2. Descriptive statistics on Age, Weight, Height, BMI, SBP, DBP, PR and RR

	N	Minimum	Maximum	Mean	Std. Deviation
Age	50	21.00	24.00	21.8400	.93372
Weight	50	43.00	90.00	61.3160	10.90052
Height	50	1.50	1.78	1.6328	.08860
BMI	50	17.90	30.30	22.9130	3.08996
SBP	50	110.00	130.00	120.0400	6.39502
DBP	50	70.00	90.00	80.2000	5.74634
PR	50	72.00	98.00	81.1200	6.94773
RR	50	12.00	26.00	18.6800	3.48431

Table-2 shows the mean and standard deviation of age, weight, height, BMI, SBP, DBP, PR and RR

Table 3. Mean and SD in Upper level, middle level and lower level

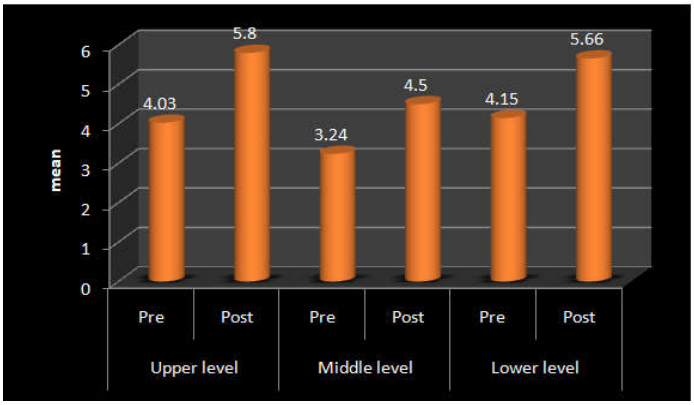
		Mean	N	Std. Deviation	Std. Error Mean
Upper level	Pre	4.03	50	1.17980	.16685
	Post	5.80	50	1.22474	.17321
Middle level	Pre	3.24	50	1.32573	.18749
	Post	4.50	50	1.61308	.22812
Lower level	Pre	4.15	50	1.21743	.17217
	Post	5.66	50	1.30321	.18430

Table-3 shows the mean and standard deviation in upper level, middle level and lower level

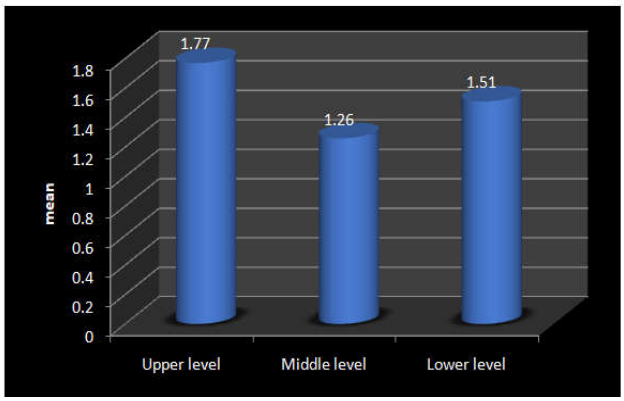
Table 4. Pre post comparison in Upper level, Middle level and Lower level

	Average improvement	Std. Deviation	t value	P value	Result
Upper level	1.77	.84037	14.893	0.000	P<0.05
Middle level	1.26	.81591	10.920	0.000	P<0.05
Lower level	1.51	.74567	14.319	0.000	P<0.05

Table-4 shows pre post comparison in upper level, middle level and lower level



Graph 4. Shows mean of Upper level, middle level and lower level



Graph 5. Shows mean of average improvement in the upper level, middle level and lower level after the foam roller stretch

The found value depicts there is a significant improvement in the treatment because p value <0.05. The possible reason for a significant post stretch value could be that the relaxed and lengthened muscles allowed the rib cage to expand well, thus not preventing its expansion.

GLOSSARY OF ABBREVIATIONS

BMI: Body Mass Index
SBP: Systolic Blood Pressure
DBP: Diastolic Blood Pressure
PR: Pulse Rate
RR: Respiratory Rate

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