Original Research Article

ESTIMATION OF LUNG FUNCTION TEST AMONG HEALTHY AND BLOW OUT WHISTLE BEGINNERS

Running title: Lung function test among healthy and blow out whistle beginners.

ABSTRACT

Introduction: Pulmonary function test is a non-invasive test. It is measured by the spirometer and it gives an idea about the lung volume, lung capacities, rates of flow and gas exchange. Breathing exercise can increase lung function. The commonly performed breathing exercises are blowing bubbles, blow out whistle, pinwheels, Hoberman spheres etc. The aim of this study is to estimate lung function among healthy and blow out whistle beginners.

Materials and methods: 60 Dental students consisting of 2 groups were involved in this study. Group 1: Control individuals (30). Group 2 individuals: blow out whistle beginners(30). Standardised RMS Helios spirometer was used. Age of 18-22, Healthy individuals and non-smokers were included in this study and smokers, alcoholic individuals, respiratory disorder individuals and post- COVID individuals were excluded from the study. Data was collected and analysed using paired 't' tests. Significance is considered at $P<0.05$ level.

Results: In this study FVC, FEV1, FEV3 were found to be significant and FEV1/FVC, FEF 25-75, PEFR were found to be insignificant. The post test values of FVC and FEV1 are comparatively higher than the pre test values. The pre test values of FEF 25-75 and FEV3 are comparatively higher than the post test values.

Conclusion: When this blow out exercise is performed there was a significant difference between healthy individuals and blow out whistle beginners. Significant increase in lung function is found. This recreational activity increases lung function which can be a preventive for many pulmonary diseases.

KEY WORDS: Blow out whistle, lung function, spirometer, breathing exercise, Innovative techniques

INTRODUCTION:

Pulmonary function test is a non invasive test which review lung function. It gives an idea about lung function, lung volume, lung capacities, rates of flow and gas exchange. Pulmonary function test is a crucial tool within diagnosis assessment. It helps in management of respiratory diseases in adults as well the older children (1). The ability of this test to be performed in preschoolers helped to assess first onset of respiratory illness and cystic fibrosis. It also aid in assessment of lung function and permit the evaluation of the therapeutic within the course of pulmonary diseases (2) (3) (4,5).

Previous studies about the investigations of the consequences of breathing exercises have revealed improvements in respiratory muscles and respiratory function that activated trunk control and significantly affected everyday mobility. Determined that raising intra-abdominal pressure during expiration through transverse abdominis exercises had a stable impact on pulmonary function, also on posture control and stabilization. Hodges and Richardson (1999) also reported that when movement began within the distal segments of the upper and lower extremities, the diaphragm increased intra-abdominal pressure, thereby establishing greater trunk stability (6). Other previous studies stated that there's an in depth correlation between breathing activity and postural control. A number of studies have also been conducted to spot methods of improving respiratory function through typical exercises like diaphragm breathing, and pursed-lip breathing. Exercise using dumbbells or weight training tools has generated unexpected results due to difficulties in accurate motion measurement and therefore the risk of injury (7). Accordingly, previous studies have emphasized the necessity to research the consequences and therefore the safety of heavy equipment in resistance exercises and claimed the necessity for alternative exercise tools. In contrast, elastic bands are considered suitable equipment for the elderly since it they're relatively safe and straightforward to use while providing similar physical strength effects to resistance exercises using existing weight training tools. Moreover, elastic bands facilitate muscle use across the whole body and are portable and economical (8). Although previous studies have reported improvements in ability using elastic bands, none have evaluated

the consequences of a rubber band exercise program with breathing techniques on pulmonary function in female seniors. Rubber band exercise with breathing techniques on elderly health have proven improvements in pulmonary function by developing a self-directed exercise program that female seniors can follow by themselves (9) (10) (11) (12).

Pulmonary function tests (PFTS) are a crucial tool within the investigation and monitoring of patients with respiratory pathology. They supply important information concerning the massive and little airways, the pulmonary parenchyma and therefore the size and integrity of the pulmonary animal tissue. Although they are doing not provide a diagnosis intrinsically, different patterns of abnormalities are seen in various respiratory diseases which helps to determine a diagnosis (13). We describe the indications for performing PFTS, describe abnormal results and correlate these with underlying pathology (14,15). Previous studies evident that students practicing sudharshana kriya yoga showed significantly better FVC, FEV1 and PEFR values supporting the beneficial role of yogic breathing exercises in adolescent school children .

Pre-schoolers used to play with this blow whistle, unknowingly this is becoming a pulmonary exercise which becomes prevention for many pulmonary diseases such as asthma, bronchitis etc. The ultimate aim of the study is to estimate lung function tests among healthy individuals and blow out whistle beginners. This research is needed to assess the effect of simple breathing exercise on lung volume capacity.

MATERIALS AND METHODS:

The study setting is simple Random sampling. This study is not an invasive procedure, it is safe and quick for most of the people. This can be considered as pros of the study. The cons of this study is, this test makes people feel dizzy, nauseating and there is a risk that they may faint. This study is approved by SRB. Investigator and principal Investigator are the people involved in this study. The sample taken is from the student population, Saveetha Dental College. Sample size is 60 and each group consists of 30 individuals. Group 1: control individuals (30) and Group 2: blow out whistle beginners (30). To minimize sampling bias simple Random sampling is used. Internal validity: standardized spirometer is used and external validity: Instrument is standardized before the measurement taken.Standardised RMS Helios spirometer was used. Age of 18-22, Healthy individuals and non-smokers were included in this study and smokers, alcoholic individuals, respiratory disorder individuals and post- COVID individuals were excluded from the study. Statistical Analysis of the data is performed in SPSS software, paired ‘t’ tests is used.

RESULTS:

The post test values of FVC are comparatively higher than the pre test values, the post test values of FEV1 are comparatively higher than the pre test values, The pre test values of FEF 25-75 are

comparatively higher than the post test values, the pre test values of PEFR are comparatively higher than the post test values and the post test values of FEV3 are comparatively higher than the pre test values. The parameters FVC, FEV1 and FEV3 were found to be significant (paired t test, p value 0.009, 0.014 and 0.009). The parameters FEF 25-75 was found to be insignificant (paired t test, p value 0.408). The pre test value of FEV1/FVC is comparatively higher than post test values. FEV1/FVC was statistically insignificant (paired t test, p value: 0.408) [TABLE:1].

TABLE 1: Represents lung function parameters before and after breathing exercise (mean ± SD).

Parameters	Pre Mean±SD	Post Mean±SD	Student 't' test p value <0.05(significant)
FVC	1.53 ± 0.47549	2.269 ±0.588	0.009
FEV1	1.503 ± 0.432	2.117 ± 0.541	0.014
FEV1/FVC	98.87 ± 3.573	94.12 ± 9.69	0.140
FEF 25-75	3.669± 1.282	3.288±1.003	0.408
PEFR	4.839±1.351	4.458± 1.408	0.425
FEV3	1.53±0.475	2.269 ± 0.588	0.009

From table 1 we can infer that as the parameters FVC, FEV1 and FEV3 were found to be significant (Paired t test, p values 0.009, 0.014 and 0.009) and the parameters, FEF 25-75, PEFR were found to be insignificant (paired t test, p values 0.408 and 0.425). Student t test p value < 0.05(significant).

DISCUSSION:

Previous studies showed that FVC, FEV1 were significant and FEV1/FVC was significant which was similar to our findings. They found significant differences in FVC, FEV1, BBS, FRT, 10MWT, TUGT in the experimental group. The study has revealed that the pulmonary functions are improved while undergoing aerobics training. During regular aerobics, it raise cardiorespiratory efficiency. It enhances good pulmonary function. Due to these exercises higher

lung volumes, high flow rates is achieved (16). The aerobic trainees after their training period compared their own values with their previous value obtained before their training period (17). When FVC was found to be normal, FEV1/FVC was low, which indicates simple obstruction and when FVC is low and FEV1/FVC is normal it indicates non-specific abnormality (13,18). In the present study, the post test value for FVC, FEV1 and FEF 25-75 are comparatively higher than pre test value, the pre test value for PEFR is comparatively higher than post test value. The parameters FVC, FEV1 and FEV3 were found to be significant with p values 0.009, 0.014 and 0.009 and the parameters, FEF 25-75, PEFR were found to be insignificant with p values 0.408 and 0.425 (significance $P<0.05$).

The study showed that the FEF 25-75, PEFR were significant and FEV3 was insignificant. In the reference study, a paired sample T test was performed and while comparing PEF levels within each group it neither exhibited significant difference before and after the experiment (9) (19) (20). FBE and BBE increase pulmonary function is often improved without utilization of specialist equipment. Which emphasize the necessity of events of varied training methods like balloons. Its importance in group program development including recreational factors, extends and helps in the function of respiratory muscles (21) (22) (23) (24). PEFR value is reduced which indicates Asthma and early airway obstruction. If the value of FEF 25-75 is reduced it can be a small airways obstruction (17) (25) (26) (27) (28). It can even occur in asthma patients and the value of a normal PEFR may be an indicator of asthma control (29) (30) (31) (32) (33). The sample size were less and time duration is very less for this study. In future study sample size must be increased and time duration must be extended. This study can be extended in different types of breathing exercises. This study should involve more participants in the future and the duration of this study must be increased.

CONCLUSION :

Within the limits of the study, when this blow out exercise is performed there was a significant difference between healthy individuals and blow out whistle beginners. There was a significant increase in lung function. This recreational activity increases lung function which can be a preventive for many pulmonary diseases such as asthma, COPD (chronic obstructive pulmonary diseases), lung cancer, pneumonia etc.

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