



## CORRELATION OF LUNG AGE IN HEALTHY, OBESE AND ATHLETIC INDIVIDUALS

### Physiotherapy

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### ABSTRACT

**BACKGROUND:** Obesity is a chronic disease characterized by the excessive accumulation of body fat that is harmful to the individuals that can cause respiratory disorders. In obese individuals, structural changes of the thoracic-abdominal region lead to limited diaphragm mobility and rib movement, both essential for appropriate ventilatory mechanics. Athletes have higher lung volumes than sedentary controls, mostly caused by respiratory adaptations to training. The concept of "lung age" to express pulmonary function by age so that participants could understand their pulmonary function easily and clearly. The aging of lung is associated with increased closing volumes. This concept is easy to understand by the general population.

**AIM:** To find out the correlation of lung age in healthy, obese and athletic individuals.

**MATERIALS AND METHODOLOGY:** 60 subjects, age ranging between 18 to 25 years of both the genders were taken, and equally divided according to BMI into normal, obese and athletic group where the individuals were playing sports regularly were taken. Any structural deformity, history of hospital visits in past 6 month and smokers were excluded. PFT spirometry - lung age was taken as an outcome measure.

**RESULT:** The primary object of the study was to find out the correlation of the lung age of normal healthy, obese and athletes individuals. When all the lung age was correlated with each other, the group with the obese individuals showed the older lung age compared to normal healthy and athlete group. While the group with the athletic individuals showed decreased lung age in compare to normal healthy and obese group. And the normal group didn't show any significant decrease and increase in the lung age.

**CONCLUSION:** The current study showed that the higher BMI are associated with the older young age, where regular physical activity can improve cardiovascular fitness therefore it shows decrease in the lung aging.

### KEYWORDS

Obesity, Lung age, Athlete, BMI.

### INTRODUCTION:

- Obesity is a chronic disease characterized by the excessive accumulation of body fat that is harmful to the individuals that can cause respiratory disorders.<sup>1</sup>
- According to the World Health Organization obesity has reached epidemic proportions, affecting people of all ages and social classes in the world obesity has nearly tripled since 1975, In 2016, more than 1.9 billion adults over 650 million were obese.<sup>1</sup> Increased body weight can cause decrease in the lung volumes.<sup>2</sup> According to the Global Burden of Disease (GBD) study, the number of overweight and obese people in South Asia are around 200 million with 150 million overweight and obese subjects in India.<sup>3</sup>
- Athletes have higher lung volumes than sedentary controls, mostly caused by respiratory adaptations to the training that increases lung elasticity and alveolar expansion.<sup>4,5</sup>
- Individuals participating in sporting activities may have higher spirometric values compared to predict ones for general population.<sup>5</sup>
- The concept of "lung age" to express pulmonary function by age so that participants could understand their pulmonary function easily and clearly. The aging of lung is associated with increased closing volumes. This concept is easy to understand by the general population.<sup>6</sup>

### NEED OF THE STUDY:

- Obesity can lead to reduce the physical and functional performance in individuals and can cause respiratory disorders. There is reduction of pulmonary functions also noted. Athletes require high aerobic capacity to achieve excellent performance in sports and they have increased pulmonary function. Few studies of lung age in relation to obesity, while at the same time many studies point to changes in lung function in this population the hypothesis of the current study is to find the correlation of obese and athlete individuals.

### METHODOLOGY:

- 60 subjects, age ranging between 18 to 25 years of both the genders were taken, and equally divided according to BMI into normal, obese and athletic group where the individuals were playing sports regularly were taken. Any structural deformity, history of hospital

visits in past 6 month and smokers were excluded. Spirometry - lung age was taken as an outcome measure. The purpose of the study was explained to the participants and oral consent was taken before the study.

- The pulmonary function test was done according to ATS guidelines and data of all the participants best of 3 spirometric lung age was taken. (Helios 401 version: 1.0) In each manoeuvre the participant was encouraged to give one's best performance.

### RESULT:

- Data was analysed using Stastical software SPSS version 21. Spearman's correlation test was used to correlate the Normal healthy, Obese and Athlete's lung age and FEV1.

### CORRELATION OF LUNG AGE

MEASURE	SPEARMEN'S CORRELATION	P- VALUE
NORMAL LA	0.389	<0.05
OBESE LA	0.456	<0.05
ATHLETE LA	0.261	<0.05

### CORRELATION OF FEV1

MEASURE	SPEARMEN'S CORRELATION	P- VALUE
NORMAL FEV1	0.526	<0.05
OBESE FEV1	0.231	<0.05
ATHLETE FEV1	0.831	<0.05

### DISCUSSION:

- The primary object of the study was to find out the correlation of the lung age of normal healthy, obese and athletes individuals.
- When all the lung age was correlated with each other, the group with the obese individuals showed the older lung age compared to normal healthy and athlete group. While the group with the athletic individuals showed decreased lung age in compare to normal healthy and obese group. And the normal group didn't show any significant decrease and increase in the lung age. The result obtained that the study didn't support the null hypothesis.
- The concept of lung age was established with the objective of becoming a tool of awareness of damages that smoking causes to the lung, leading to premature aging of the organ.<sup>7</sup> Studies have been applied to find out the effect of smoking, adiposity and other associated respiratory conditions on lung age.<sup>7-10</sup>

- Parkes et al<sup>7</sup> conducted a study with 561 smokers with age up to 35 years and found that telling smokers their lung age significantly improved the probability of an individual to quit smoking. Donna R. Parker et al<sup>12</sup> stated that lung age was well received by the majority of Primary Care Providers and appears feasible to use with COPD patients who smoke.
- There are studies which suggest that athletes have higher lung volumes.<sup>4,5</sup> that are described as that the athletes have higher lung volumes because exercise training improves endurance and strength of respiratory muscles; it also causes resistance reduction in respiratory canals and increases lung elasticity and alveolar expansion.<sup>5</sup>
- The measurement of lung age suggests an identification of the pulmonary impairment of individuals with morbid obesity.<sup>7</sup> FEV1 is a powerful predictor of mortality and morbidity in general, lung diseases, cardiovascular diseases, and cancers.<sup>13</sup>
- An appropriate program for losing excess weight not only improves lung function but also causes a reduction in lung age.<sup>11</sup>

#### LIMITATION:

- Small sample size.

#### FURUTRE SCOPE:

- Different age groups can be taken.
- Effect of treatment protocol can be checked on lung age.
- Smokers, non-smokers- obese, normal and athletes can be the subjects of future study.

#### CONCLUSION:

- Current study showed that the higher BMI are associated with the older young age, where regular physical activity can improve cardiovascular fitness therefore it shows decrease in the lung aging.

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