Original article:

Effect of posture on vital capacity in both males and females phase I medical students

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Abstract:

Background: Vital capacity (VC) is maximal volume of air forcefully expelled from the lungs after a maximal inspiration. Vital Capacity is a critical component of good health. Measurement of VC is useful diagnostically and is an important pulmonary function test. The aims and objectives of the present study constituted the effect of posture on vital capacity in both males and females.

Material and methods: 100 healthy medical students (50 males,50 females) of 2014-15 batch studying at the Vijayanagar Institute of Medical Sciences belonging to both the sexes volunteered for the study. The study was conducted at the department of Physiology during the month of July 2015. After informed consent, the volunteer students were asked to report to the department at afternoon (2.00 pm) during routine practical class by using Vitalography in standing and sitting posture. Anthropometry was conducted at the point of entry into the study using standard protocol.

Results : Effect of posture on vital capacity in both males and Females phase I medical students . BMI Male 20.6±3.4, VC (standing) 4±0.24, VC(sitting) 3.2±0.21, BMI Female 20±3.5, VC (standing) 3.1±0.45, VC(sitting) 2.2±0.42.showing males having high rate of VC than females.

Conclusion: Vital Capacity is dependent on other factors besides age, posture,sex and Body mass index. Therefore, the recorded values can be considered normal. Many of the differences observed in this study are due to the smaller lungs and presumably the smaller diameter airways in women. Several studies have reported that women may be susceptible to pulmonary system limitations during exercise including exercise-induced arterial hypoxaemia.

Introduction

Total Lung Capacity (TLC) is the amount of air our lungs can hold when completely full. If we blow all the air out of our lungs that we can, then we have some amount still there because our lungs are made never to be totally empty. We call the amount still left residual volume (RV) and the amount that we blew out vital capacity (VC). So our total lung capacity (TLC) equals our vital capacity (VC) plus our residual volume (RV). TLC = VC + RV.[1]

If our lungs and chest are exercised and well inflated we can maintain our very important vital capacity. Keeping our vital capacity where it needs to be will maintain our oxygen levels; and improving our vital capacity certainly suggests that we can improve our oxygen levels. In most studies, athletes and mountain climbers have larger vital capacities than the average person. Larger vital capacities can help keep oxygen at levels where we have more oxygen available to the brain and body.[1]

We can maintain and improve our oxygen availability to the brain, and second that we can keep our lungs open and functioning well enough to minimize the chances of having health problems. If we don't keep our lungs open and clear we can develop pneumonia, and small areas of our lungs tend to collapse (called micro-atelectasis) from not being properly inflated.[1]In this group the vital capacity figures of one year were compared with those of the next. It will be seen that many

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variations occurred both above and below the readings of the previous year; that both men and women exhibited an average gain, and that the men gained more than the women. The gain of the men exceeds three times the standard error of the mean and is statistically significant, that of the women is not. It was interesting to compare these findings with the variations from the hypothetical vital capacity as calculated from the standards of West which are based upon surface area. As would be expected, the variations from West's standard were considerably greater than those from the reading of the previous year, showing that the latter offered a better basis for predicting the vital capacity than did West's surface area standard.[2]

Vital capacity (VC) is maximal volume of air forcefully expelled from the lungs after a maximal inspiration. Vital Capacity is a critical component of good health. Measurement of VC is useful diagnostically and is an important pulmonary function test.[5] Lung function tests provide a clearer understanding of pulmonary function in subjects of different races, age,sex, occupation and profession. If there are functional abnormalities in the respiratory system, the deviation from normal can form a basis for diagnosis and assessment of progress in the management of chronic ventilator diseases.[6] Tests of lung function, of which spirometry is by far the most common, find application in diagnosis, assessment and management of patients with different lung diseases and also as outcome tools in research studies.[7] The aims and objectives of the present study constituted the effect of posture on vital capacity in both males and females.

Material and methods

100 healthy medical students (50 males,50 females) of 2014-15 batch studying at the Vijayanagar Institute of Medical Sciences belonging to both the sexes volunteered for the study. The study was conducted at the department of Physiology during the month of July 2015. After informed consent, the volunteer students were asked to report to the department at afternoon (2.00 pm) during routine practical class by using Vitalography in standing and sitting posture. Anthropometry was conducted at the point of entry into the study using standard protocol.

Statistical analysis

The data analysis was carried out using the Statistics(SPSS). Statistical significance of difference in mean values between groups was assessed using independent samples t-test.

Results

Table and graph showing Effect of posture on vital capacity in both males and Females phase I medical students

GENDER	MALE	FEMALE
BMI	20.6±3.4	20±3.5
VC (standing)	4±0.24	3.1±0.45
VC(sitting)	3.2±0.21	2.2±0.42

Discussion

Over the past 30 years, pulmonary function testing has been put to widespread clinical use and is presently considered an essential prerequisite to diagnose various obstructive and restrictive disorders. Spirometry is the most widely used screening test for lung function or pulmonary function studies. It is usually the first test to be performed and interpreted.[3] Our study highlights the importance of obtaining normative values for lung function in medical students. Higher results of recorded vital capacity in males because of large chest size,more musle power and more body surface area and standing posture VC is more compared to sitting because in standing position (a) decrease in venous return,decreases the pulmonary blood flow and (b) diaphragm descends down,thus increasing inspiration,[4] than in female students and

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also higher results of recorded vital capacity in standing than in sitting posture. The present study shows a statistically significant relationship between Height, Posture and recorded vital capacity in both male and female medical students.

Conclusion

Vital Capacity is dependent on other factors besides age, posture,sex and Body mass index. Therefore, the recorded values can be considered normal. Many of the differences observed in this study are due to the smaller lungs and presumably the smaller diameter airways in women. Several studies have reported that women may be susceptible to pulmonary system limitations during exercise including exercise-induced arterial hypoxaemia.[8]

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