

Thesis Title	Pulmonary Function in Smokers
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Abstract

To determine the long-term effects of cigarette smoking on pulmonary function and also to achieve the desirable goal of simple reliable test which can give early detection of the increase in small airway resistance in smokers. Spirometry was performed in 185 healthy males including the employees of Siriraj Hospital and the medical science technician students of the faculty of Medicine, Siriraj Hospital, Mahidol University. The subjects were separated into four groups of 38 nonsmokers (NSM), 56 light smokers (LSM), 52 moderate smokers (MSM) and 39 heavy smokers (HSM). Subjects had not smoked for at least two hours before the study. The forced expiratory spiograms were done by each subject on two occasions two weeks apart for testing intra-individual variability. From the forced expiratory spiograms, forced vital capacity (FVC) ; forced expiratory volume in 1 second (FEV₁); forced expiratory volume in 1 second expressed as a percentage of forced vital capacity (%FEV₁); maximal expiratory flow rate (MEFR); and maximal mid expiratory flow rate (MMFR), forced expiratory flow between 80 and 70 percent of the FVC (FEF_{80-70%}), between 55 and 45 percent of the FVC (FEF_{55-45%}), between 30 and 20 percent of the FVC

(FEF_{30-20%}), and between 15 and 5 percent of the FVC (FEF_{15-5%}).

In this study it was found that all values calculated from the forced expiratory spirogram. Most of the forced expiratory flow progressively declined with degree of smoking from NSM, LSM, MSM to HSM. The values of %FEV₁, FEF_{30-20%}, and FEF_{15-5%} were progressively lower with statistically significant from NSM, LSM, MSM to HSM. The FEF_{80-70%}, MMFR and FEV₁ were lower with statistically significant in NSM compared to HSM. FEF_{55-45%} was lower with statistically significant in NSM, LSM, MSM compared to HSM. The decrease in FVC and MEFR seen in each group of smokers were not statistically significant.

Comparing the degree of changes of all the tests, it was found that flow rate at lower lung volumes showed greater change than flow rate at higher lung volumes. From all values changed, it was suggested that the early change in the lungs of smokers were in small airways, the large airways were still normal. It also indicated that the most sensitive test for detecting the increase in small airway resistance in smokers was the FEF_{15-5%} of the FVC and the second sensitive test was the FEF_{30-20%} of the FVC.

From the results it is indicated that the early change in the small airways of smokers can be determined by analysis of the flow at the terminal portion of the FVC which is a simple and safe test. It can detect abnormality in asymptomatic smokers. If the tests are abnormal, the smokers should stop their habit of smoking to reverse the abnormality in their lungs, and also to avoid suffering from small airway disease.