

Smoking gun: just one cigarette has harmful effect on the arteries of young healthy adults

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Even one cigarette has serious adverse effects on young adults, according to research presented by Dr. Stella Daskalopoulou at the Canadian Cardiovascular Congress 2009, co-hosted by the Heart and Stroke Foundation and the Canadian Cardiovascular Society.

Her study found that smoking one cigarette increases the stiffness of the arteries in 18 to 30 year olds by a whopping 25 per cent.

Arteries that are stiff or rigid increase resistance in the blood vessels, making the heart work harder. The stiffer the artery, the greater the risk for heart disease or stroke.

"Young adults aged 20-24 years have the highest smoking rate of all age groups in Canada," says Dr. Daskalopoulou, an internal medicine and vascular medicine specialist at McGill University Health Centre. "Our results are significant because they suggest that smoking just a few cigarettes a day impacts the health of the arteries. This was revealed very clearly when these young people were placed under physical stress, such as exercise."

The study compared the [arterial stiffness](#) of young smokers (five to six cigarettes a day) to non-smokers. The median age was 21 years. Arterial measurements were taken in the radial artery (in the wrist), the [carotid artery](#) (in the neck), and in the femoral artery (in the groin), at rest and after exercise.

Arterial stiffness in both smokers and non-smokers was measured using a new but well established method called applanation tonometry. Dr. Daskalopoulou introduced the 'arterial stress test' which measures the arteries' response to the stress of exercise. The test is comparable to a cardiac stress test, which measures the heart's response to the stress of exercise.

"In effect we were measuring the elasticity of arteries under challenge from tobacco," explains Dr. Daskalopoulou.

An initial arterial stress test was carried out to establish a baseline measurement for both the non-smokers and the smokers, who were asked not to smoke for 12 hours prior to the test. After the first meeting, smokers returned and smoked one cigarette each and then repeated the stress test. During the final meeting, smokers were asked to chew a piece of nicotine gum prior to the stress test.

Dr. Daskalopoulou found that after exercise the arterial stiffness levels in non-smokers dropped by 3.6 per cent. Smokers, however, showed the reverse: after exercise their arterial stiffness increased by 2.2 per cent. After nicotine gum, it increased by 12.6 per cent. After one cigarette, it increased by 24.5 per cent.

Interestingly, there was no difference in the arterial stiffness measurements between smokers and non-smokers at rest.

"In effect, this means that even light smoking in otherwise young healthy people can damage the arteries, compromising the ability of their bodies to cope with physical stress, such as climbing a set of stairs or running to catch a bus," says Dr. Daskalopoulou. "It seems that this compromise to respond to physical stress occurs first, before the damage of the arteries becomes evident at rest."

"More than 47,000 Canadians will die prematurely each year due to tobacco use, which often starts in the teen years," warns Heart and Stroke Foundation spokesperson Dr. Beth Abramson. "We know that over 90 per cent of teenagers who smoke as few as three to four cigarettes a day may be trapped into a lifelong habit of regular smoking, which typically lasts 35 to 40 years."

Smoking contributes to the build up of plaque in the arteries, increases the risk of blood clots, reduces the oxygen in the blood, increases blood pressure, and makes the heart work harder. Smoking also nearly doubles the risk of ischemic stroke.

Dr. Abramson says this study reinforces the importance of education, prevention programs, and legislation such as the recently passed Bill C-32, Cracking Down on Tobacco Marketing Aimed at Youth Act.

Source: Heart and Stroke Foundation of Canada

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