

CAMPAIGN For TOBACCO-FREE Kids[®]

SMOKING AND DECREASED PHYSICAL PERFORMANCE

Smoking just a single cigarette can immediately affect physical capability in exercise when the inhaled carbon monoxide binds to red blood cells, displacing oxygen and preventing its delivery to muscle cells. In fact, a study at UCLA found that young adults experience a four percent decrease in oxygen uptake right after smoking.¹ At the same time, smoking constricts blood vessels, which prevents the proper redistribution of blood and oxygen to the muscles during exercise. This forces muscle cells to switch to an inefficient metabolic process that hampers exercise and prompts the accumulation of lactic acid within the cells.² Beyond these immediate effects, regular smokers face even greater performance problems.

- Smokers have a reduced performance at all levels of physical training, smaller improvement with training, and less endurance than nonsmokers.³ A study of young adults found that smokers' endurance was 7.2 percent less than nonsmokers, and that smokers were more likely to quit at increasing levels of exercise.⁴
- Smokers have higher resting heart rates and lower maximum heart rates than nonsmokers. The higher resting heart rates means that smokers' hearts are always having to work harder to pump blood throughout the body. Because of their limited maximum heart rates, smokers hearts also cannot efficiently pump additional nutrient and oxygen rich blood to the smokers' working muscles when needed during times of stress, such as exercise.⁵
- Adolescent smokers have measurable deficits in lung function consistent with early signs of obstructive airway disease, and smoking slows the normal development and growth of lung function, especially in girls.⁶
- Young men and women who smoke are significantly more likely to incur exercise-related injuries. Among young men and women in Army basic training, smokers were approximately twice as likely to incur injuries than nonsmokers.⁷
- Smokers heal slower from injuries than nonsmokers.⁸ For example, smokers with fractures of the tibia or lower leg bone required four weeks longer than nonsmokers to heal and were more likely not to heal at all.⁹

Although some good athletes smoke, they would be even better if they did not. People who quit smoking demonstrate improved exercise performance compared to those who continue.¹⁰

Smokers Are Less Physically Active. It has long been known that smokers tend to be less physically active than nonsmokers, and vice versa.¹¹ For instance, a study in *Public Health Reports* found smokers are more likely to quit supervised exercise programs.¹² Another study found that male high school students who were less physically active than their peers were twice as likely to smoke.¹³

Some people unwisely begin or continue smoking as a weight control measure. But the links between smoking and less physical activity and decreased physical performance actually interfere with healthy and effective weight control.¹⁴ In fact, men who smoke expend 30 to 35 thousand fewer calories of energy per day than nonsmokers.¹⁵ And studies show that the body fat of smokers tends to be distributed in a pattern that has adverse health implications.¹⁶

Physical Activity Prevents Smoking and May Help Smokers Quit. The good news is that individuals who exercise are less likely to smoke, and engaging in exercise may be able to help smokers quit.¹⁷ In addition:

- A study in the *Journal of the American Medical Association* found that those students who played one interscholastic sport were approximately one third as likely to smoke as children who did not participate in sports. In addition, those who participated in two sports were even less likely to smoke.¹⁸
- Children and adolescents who do not participate in regular exercise and who smoke are more likely to carry these negative behaviors into adulthood versus those individuals who engage in healthy behaviors early in life.¹⁹

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Related Campaign Fact Sheets (available at www.tobaccofreekids.org)

Tobacco Harm to Kids

The Path to Smoking Addiction Starts at Very Young Ages

¹ Hirsch GL, et al., "Immediate effects of smoking on cardiorespiratory response to exercise." *Journal of Applied Physiology*, 1985 June, 58:1975-81.

² Hirsch GL, et al., 1985 June.

³ Cooper KH, et al., "Effects of Cigarette smoking on endurance performance," *Journal of the American Medical Association*, 1968 January 15, 203: 189-192.

⁴ Sidney S, et al., "Cigarette smoking and submaximal exercise test duration in a biracial population of young adults: the CARDIA study," *Medicine and Science in Sports and Exercise*, 1993 August, 25(8): 911-916.

⁵ Sidney S, et al., 1999 August.

⁶ Gold DR, et al., "Effects of Cigarette Smoking on Lung Function in Adolescent Boys And Girls," *New England Journal of Medicine*, 1996 September, 335(13): 931-937.

⁷ Altarac M, et al., "Cigarette Smoking and Exercise-Related Injuries Among Young Men and Women," *American Journal of Preventive Medicine*, 2000 April, 18(Suppl 3): 96-102.

⁸ Silverstein P, "Smoking and Wound Healing," *American Journal of Medicine*, 1992 July, 93(1A): 22S-24S.

⁹ Adams CI, et al., "Cigarette Smoking and open tibial fractures," *Injury*, 2001 January, 32(1): 61-5.

¹⁰ Albrecht AE, et al., "Effect of smoking cessation on exercise performance in female smokers participating in exercise training," *American Journal of Cardiology*, 1998 October, 82(8): 950-5.

¹¹ Blair SN, et al., "Relationship Between Exercise or Physical Activity and Other Health Behaviors," *Public Health Reports*, 1985 March-April, 100(2): 172-180; Faulkner RA, et al., "The Relationship of Physical Activity to Smoking Characteristics in Canadian Men and Women," *Canadian Journal of Public Health*, 1987 May-June, 78(3): 155-60; Lazarus NB, et al., "Smoking and Body Mass in the Natural History of Physical Activity: Prospective Evidence from the Alameda County Study, 1965-1974," *American Journal of Preventive Medicine*, 1989 May-June, 5(3): 127-35.

¹² Dishman RK, et al., "The Determinants of Physical Activity and Exercise," *Public Health Reports*, 1985 March-April, 100(2): 158-71.

¹³ Winnail SD, et al., "Relationship Between Physical Activity Level and Cigarette, Smokeless Tobacco, and Marijuana Use Among Public High School Adolescents," *Journal of School Health*, 1995 December, 65(10): 438-442.

¹⁴ Tomeo CA, et al., "Weight Concerns, Weight Control Behavior, and Smoking Initiation," *Pediatrics*, 1999 October, 104(4): 918-924.

¹⁵ Folsom AR, et al., "Leisure time physical activity and its relationship to coronary risk factors in a population-based sample. The Minnesota Heart Survey," *American Journal of Epidemiology*, 1985 April, 121(4): 570-9.

¹⁶ Lissner L, et al., "Smoking initiation and cessation in relation to body fat distribution based on data from a study of Swedish women," *American Journal of Public Health*, 1992 February, 82(2): 273-5.

¹⁷ Ussher MH, et al., "Does exercise aid smoking cessation? A systematic review," *Addiction*, 2000 February, 95(2): 199-208.

¹⁸ Escobedo LG, et al., "Sports Participation, age at smoking initiation, and the risk of smoking among US high school students," *Journal of the American Medical Association*, 1993 March, 269 (11): 1391-5.

¹⁹ Kelder SH, et al., "Longitudinal Tracking of Adolescent Smoking, Physical Activity, and Food Choice Behaviors," *American Journal of Public Health*, 1994 July, 84(7): 1121-1126; Chassin L, et al., "The natural history of cigarette smoking from adolescence to adulthood: demographic predictors of continuity and change," *Health Psychology*, 1996 November, 15(6): 478-84.