

these events. Now, Polderman et al challenges our knowledge with a very interesting explanation/observation for some of these mysterious events. They describe a complication that refers to irritation of the posterior wall of the trachea secondary to chronic irritation by the tracheostomy cannula that causes an intermittent obstruction of the tracheal tube. Polderman et al suggest the acronym TWISTED (tracheal wall injury with intermittent stoppage of the tracheostomy and episodes of dyspnea). It is important for all of us who care for tracheostomized patients to be aware of this potential problem, and to learn how to manage it. Finally, after the sad events of the last year, I can honestly say that we live in a TWISTED world.

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## Smoking

### Not for Anyone

There is no question that the harmful effects that are produced by smoking cigarettes continue to be a burden for health systems throughout the world, and for the individuals who succumb to diseases that are caused by smoking.<sup>1</sup> Thus, it is imperative that all medical practitioners who are in clinical practice, irrespective of their clinical interest, assess the smoking status of all their patients and, in those patients who are smoking, address the problem of getting them to quit. This is most eloquently stated in the pledge of the American College of Chest Physicians (ACCP), which is taken by new Fellows, "As a Fellow of the American College of Chest Physicians and a leader in the most important struggle faced by chest physicians, the prevention and control of our major health problems of lung cancer, cardiovascular and chronic pulmonary disease, I shall make a special personal effort to control smoking and to eliminate this hazard from my office, clinic, and hospital. I shall ask all of my patients about their smoking habits, and I shall assist the cigarette smoker in stopping smoking. I make this pledge to my patients and to society."<sup>2</sup> Such sentiments also have been expressed in other parts of the world. For example, the Thoracic Society of Australia and New Zealand now has as one of its major goals the achievement of a smoke-free society in both countries. The British Health Education Authority advises that health-care workers should ask about smoking at every opportunity, and advise all smokers to quit.<sup>3</sup> The US Agency for Health Care Policy and Research recommends that "it is essential to provide effective cessation intervention for all tobacco users at each clinical visit."<sup>4</sup>

In countries such as the United States and Australia, governments, various health agencies, and professional bodies, like the ACCP, have been successful in reducing smoking rates in the general population. This has been achieved with a range of initiatives, including increasing the cost of cigarettes through taxes, restricting the advertising and promotion of cigarettes, conducting campaigns informing the public of the health risks associated with smoking, reducing the access to cigarettes, and restricting



smoking in public places.<sup>1</sup> However, despite these measures, there still remains a group of smokers who find it very difficult to quit, even though many wish that they could give up smoking.<sup>4</sup> Many of these smokers are addicted to the nicotine that they absorb with each cigarette that they smoke. Nicotine is a highly addictive substance, and nicotine addiction is now a recognized disease.<sup>5</sup> Thus, it is likely that most smokers in developed countries, where smoking rates range from 20 to 30%, are nicotine addicts.

Nicotinic acetylcholine receptors are distributed widely in the nervous system, but those at neuromuscular junctions are insensitive to the effects of nicotine. Nicotine exerts its effects via nicotinic receptors in the brain. It activates the mesolimbic dopaminergic system, which is involved in behavior reinforcement, so exposure to nicotine leads to behaviors to obtain further exposures to nicotine. These effects are mediated primarily through the D1 and D2 receptors. Serotonergic and noradrenergic systems are also involved, particularly with withdrawal symptoms.<sup>6,7</sup>

Not all smokers become nicotine addicts, and so not all smokers find smoking equally difficult to stop. The review by Batra et al in this issue of *CHEST* (see page 1730) draws together our knowledge of the evidence about the genetic predisposition to become addicted to nicotine. Even though a firm genetic explanation for smoking has not been established, twin and family studies have consistently suggested that 50 to 80% of smoking incidence is due to genetic factors. A distinction needs to be made between the initiation of smoking and the continuation of smoking, as it is likely that the initiation of smoking is less influenced by genetic factors. Animal studies using inbred strains, and transgenic and knockout mice indicate that the number of nicotine receptors in the brain and the effects of nicotine on the dopamine metabolism are genetically determined, although there is a question about the applicability of such animal studies to humans. It is not expected that a single gene influencing smoking behavior will be found but rather that a number genetic variations may have a role. For example, a more rapid metabolism of nicotine is associated with a greater chance of being nicotine-dependent. Dopamine is thought to be important in reinforcing smoking behavior, and variations in dopamine receptors, transport genes, and metabolism seem to have a role in predisposing a person to smoke.

The genetic predisposition to become addicted to nicotine is likely to be important in explaining why some young people shift from being experimental smokers to being lifelong smokers, and why many smokers find it difficult to give up smoking. However, it is clearly not the only explanation, and so we

must not become complacent about dealing with the environmental factors that contribute to long-term smoking. For example, it has been shown in adolescents that having friends who smoke markedly increases the chances that an individual will smoke.<sup>8</sup> Other factors that are likely to have a role include promotional activities by tobacco companies, access to cigarettes, parental smoking habits, and a society's attitudes toward smoking. If a young person with a strong genetic predisposition to become a nicotine addict never tries a cigarette, then the genetic predisposition of that person is not so important. Thus, it is most important that programs, such as those supported and run by the ACCP, that are designed to encourage young people not to take up smoking, are maintained. Pressures must be placed on governments, not only in the United States, but also around the world, to limit the promotion of cigarettes to young people and to reduce adolescents' access to them. Also, initiatives to make smoking an antisocial, unacceptable activity must be pursued to reduce the likelihood that smoking will be adopted by those predisposed to nicotine addiction, as well as those not so predisposed.

With knowledge about the addictive potential of nicotine and the genetic predisposition to become addicted to nicotine, we can now be confident that the days of the authoritarian doctor are over. It is now no longer acceptable that a doctor simply demands that patients stop smoking before they receive further treatment. Smoking, and attempts to quit smoking, need to be regarded as conditions that require specific treatment. Not only do we have to ask all our patients whether they smoke, and not only do we have to encourage all our smokers to quit smoking, we have to do it with the same clinical care and skill that we use to treat all diseases and health complaints in our patients. Quitting is now recognized as a process that takes time, and repeated attempts are needed in most smokers. This process has several stages, and with empathic and motivational interviewing and counseling, smokers can be taken through these stages.<sup>3,4,9</sup>

Even brief, simple advice about quitting smoking from doctors to their patients has been shown to increase the chances of smokers quitting by 2 to 3%.<sup>3,9</sup> More intensive and frequent counseling can improve the chances further.<sup>3,4,9</sup> In addition, pharmacologic interventions, in particular nicotine replacement therapy<sup>3,9-11</sup> and slow-release bupropion therapy, can increase quit rates even further. Bupropion can increase quit rates two to three times above placebo in those persons who are motivated to quit and who are receiving counseling.<sup>9,11,12</sup> In the primary care setting, nicotine replacement therapy can improve long-term abstinence rates from about



5 to 10%.<sup>3,9</sup> This is irrespective of the mode of delivery, such as patches, gum, lozenges, nasal spray, or inhalers.

In summary, knowledge about the genetics of smoking and nicotine addiction allows us to recognize that smoking cessation requires careful clinical management. However, smoking is not just due to genetic factors, as environmental factors also play an important role. Thus, attempts to reduce the incidence of smoking in the community by governments, professional organizations, and individual doctors remain important.

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