



## **Adhesive Nicotine Patches Help Pilots Quit Smoking**

*The availability of new programs to help smokers quit the habit while reducing or minimizing withdrawal symptoms may be especially well suited for flight crews. Studies indicate that sudden nicotine deprivation causes withdrawal symptoms that degrade pilot performance.*

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by

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As the detrimental health consequences of smoking become more widely understood, a record number of people worldwide are quitting the use of tobacco products.

This change is especially reflected among professional pilots who have developed life-styles to promote good health and career longevity. Some airlines will not hire a pilot who smokes, and other operators prohibit smoking on the flight deck.

[In the United States, Federal Aviation Regulations (FAR) prohibit smoking on U.S. domestic flights of under six hours, but smoking on the flight deck is permitted if the pilot-in-command authorizes it. Smoking on the flight deck is prohibited during takeoffs and landings.]

Tobacco use results in a powerful addiction to nicotine, which can trigger disturbing withdrawal symptoms. If cigarettes or other tobacco products are not available,

addicted tobacco users often become irritable and restless, and they can experience difficulties in mental concentration along with generalized feelings of illness. Quitting tobacco use without some assistance is difficult and often unsuccessful. Relapses occur frequently.

A number of publications and programs provide specific guidance on how to quit smoking successfully. In addition, there are audio cassette tapes that can assist smokers to quit. (See references on page 4.)

Various approaches have been developed to help those who are "hooked" and want to quit, but who cannot stop smoking without assistance. There are now several transdermal nicotine delivery systems using skin-adhesive patches that can help the smoker move away from the lung-destroying inhalation method of nicotine acquisition. More adhesive patch treatment systems can be expected in the future.

## Adhesive Nicotine Patches Help Reduce Withdrawal Symptoms

At least four companies have conducted research and perfected the use of transdermal nicotine delivery systems for sale in the United States (Figure 1, page 3). The companies offer the products Nicoderm, Prostep, Habitrol and Nicotrol, which are available by prescription. These systems are available under a physician's guidance, and their use can be tailored to a given person's needs.

Nicotine is absorbed rapidly by the skin, and about half of it is eliminated from the body in one and a half hours. The skin delivery system provides a target blood level of nicotine so that the individual who stops smoking will not experience (during the initial period of not smoking) the withdrawal symptoms that plague most tobacco smokers when they try to quit. This appears especially important for pilots who smoke.

[Research conducted by the U.S. Federal Aviation Administration's (FAA) Civil Aeromedical Institute suggests that sudden nicotine withdrawal should be avoided on the flight deck. "For some, withdrawal symptoms including tension, depression, irritability, difficulty in concentration, decreased heart rate, a fall in blood pressure ... and impaired performance may occur and may more than offset any benefits to aviation safety that are expected from a ban on preflight and inflight smoking," concluded an FAA study on the effects of tobacco on aviation safety.

The FAA study said it supported "smoking cessation programs and pharmacologic approaches to nicotine replacement ... for improved health, performance and safety." But it recommended smoking cessation programs that minimized flight deck withdrawal symptoms. Nicotine patches would achieve that goal by reducing or eliminating withdrawal symptoms.

Another FAA study said experiments of complex pilot performance conducted at a simulated operational cabin altitude of 6,500 feet found "significant adverse effects of smoking withdrawal."

"When smoking was permitted the overall index of performance was maintained at the initial level or higher over four hours of testing," the FAA study said. "When smoking was prohibited, however, performance declined with time. The effect was largely a decrement in tracking performance, a

psychomotor function important to flying."

The study concluded: "Although there were no significant differences between the performance of nondeprived smokers and nonsmokers, smokers who were deprived had significantly inferior tracking and vigilance performance."

A report prepared by the U.S. National Institutes of Health also found that the "fast decline of plasma nicotine and other effects of withdrawal in the habitual smoker are associated with decrements in vigilance and concentration, and with increased irritability, anxiety and aggression."

But that is not a reason to keep smoking.

In addition to identifying long-term health-damaging aspects of smoking, aeromedical studies have established a strong link between smoking and adverse performance effects in the cockpit. Carbon monoxide and nicotine from smoking are known to affect altitude tolerance, vision and certain judgment and psychomotor skills.

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*... aeromedical studies have established an undeniable link between smoking and adverse performance effects in the cockpit.*

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Recent research has shown that many persons find skin patches to be of benefit in getting through the withdrawal period following smoking cessation, which usually lasts two to four weeks. The patches are available in decreasing sizes. As the smoker gradually reduces nicotine addiction, smaller doses of nicotine can be delivered and still alleviate withdrawal symptoms. Symptoms alleviated by the adhesive patch nicotine delivery systems include concentration difficulty, irritability, general feeling of unease, agitation and headache.

Once the patch is in place, the individual must not smoke. Smoking while wearing the patch would expose the body to a dangerously high dose of nicotine. Nicotine is a deadly poison in high doses. Similarly, nicotine chewing gum cannot be used while the patches are worn.

Studies indicate that smokers who use the patch plus a behavioral modification activity to quit smoking have a higher chance of success without a smoking relapse. It has also been found that after about two weeks of non-smoking, and after phasing down with the nicotine patches over four to eight weeks, the individual ex-smoker will experience higher quality sleep, will need less sleep, will be more mentally alert and will have more energy. In addition, the ex-smoker will have an enhanced sense of smell and taste, and will thus use less salt on food, leading to a lower risk of hypertension.

When tobacco is smoked, each inhalation delivers nicotine into the lungs and then into the blood stream where the nicotine is carried to the brain within eight seconds. The immediate result is to relieve any developing withdrawal symptoms. It creates a feeling of relief for the addicted person. The continual seeking of this relief is one of the causes of continued nicotine dependence and addiction. Patches deliver small, controlled doses of nicotine throughout a sustained period of time, thus working to offset the disturbing symptoms on withdrawal from nicotine.

One of the patch systems, for example, is applied once a day in accordance with the prescription, usually in the morning. The time of application can be varied based on individual preference and the agreement of the prescribing physician. However, the patch should be applied at the same time each day. Some of the patches can be worn while bathing in a tub or a shower, while using a hot tub, or while swimming. These patches stick tightly. The user applies a given patch for only one 24-hour time period or for another period as prescribed. Only one patch can be worn at a time. Each patch is applied to some part of the upper body, upper arm or upper back, and the location of the patches is varied from day to day. This variation is intended to avoid minor skin irritation that could develop by applying the patch repeatedly in the same place day after day.

Directions that come with the patches tell how to discard them and also emphasize that patches must be kept away from small children and pets because any nicotine exposure would be too high for their body sizes. Pregnant women should be certain their physicians are aware they are pregnant. It is well established that pregnant women who smoke can cause serious damage to the developing fetus.

Services are also available that can provide both physical and emotional support during the withdrawal process. Support hotlines that can help an individual understand withdrawal problems are also very important. Such encouragement and assistance have been found to be helpful in preventing smoking relapses.

Persons who quit smoking do not automatically gain weight. In fact, a significant number of persons who have quit do not put on weight. One way to avoid gaining weight is to engage in moderate exercise and to be moderate in food consumption, especially with respect to consuming sweets as a substitute for smoking.

As with any addiction, an approach that targets progress one day at a time is the most successful. Substitute hand actions must be learned to replace the fiddling with lighters, cigarettes and other smoking materials and paraphernalia that characterize the smoker. Avoidance of alcohol is also an important consideration because it can cause ex-smokers to relapse through impaired judgment or prior association. Alcohol in small amounts can be consumed by ex-smokers without relapsing if the individual is vigilant against relapse tendencies.

Exercise is a very important part of the quitting program. Health spa activities, swimming, walking, hiking, bicycling, and jogging are all excellent forms of exercise that can be used to eliminate the desire to smoke.

<b>Four Transdermal Patch Systems</b>				
	<b>Nicoderm</b> (Marion Merrell Dow)	<b>Prostep</b> (Lederle)	<b>Habitrol</b> (Ciba-Geigy)	<b>Nicotrol</b> (Parke-Davis)
Nicotine content (mg)	114 (22 sq. cm)	30 (7 sq. cm)	52.5 (30 sq. cm)	24.9 (30 sq. cm)
Dosage per time period	21 mg/24h	22 mg/24h	21 mg/24h	15 mg/16h
Duration of treatment	4-8 weeks	4-8 weeks	4-8 weeks	4-12 weeks

Note: Smaller sizes with lower nicotine doses are available for light smokers (less than one-half pack per day and for persons weighing less than 110 pounds (50 kg.).

Source: Stanley R. Mohler, M.D.

**Figure 1**

The dividends of nonsmoking include greatly diminished risk of emphysema (a crippling lung disease), lung cancer, self-immolation in bed, throat cancer, cardiovascular disease, stroke, aneurysm of the large blood vessels, retinal cell death and many other serious conditions.

In addition, a recent study on the harmful effects of cigarette smoking on 17,824 U.S. males found that during a five-year period, smokers of 20 or more cigarettes per day developed cataracts at twice the rate of nonsmokers.

It is suspected that cigarette smoking changes the nature of the nutrients on which the lens of the eye depends to maintain its transparency. It is also possible that elevated blood carbon monoxide levels may damage the lens of the eye by interfering with the metabolism of the lens cells. Nicotine or the effects of nicotine metabolic products may also injure the lens. Statistics suggest that 20 percent of cataract cases in the United States are attributable to cigarette smoking.

As transparency of the lens is an important factor for safe flight, smoking cigarettes is clearly incompatible with piloting aircraft.

There are clear health incentives for pilots to quit smoking, and there are increasingly effective ways to successfully kick the habit. ♦

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