

Hooked from the first cigarette

One cigarette may be all it takes to get hooked. A 10-point questionnaire can help you drive that point home to adolescents who occasionally light up

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Practice recommendations

- Teach adolescents that one cigarette is often all it takes to get hooked (C).
- The “Hooked On Nicotine Checklist” is a self-assessment tool that may help motivate some adolescent smokers to quit (C).
- Even adolescents who smoke only a few cigarettes per week may need your help with quitting (C).

Strength of recommendation (SOR)

- A Good-quality patient-oriented evidence
 B Inconsistent or limited-quality patient-oriented evidence
 C Consensus, usual practice, opinion, disease-oriented evidence, case series

A 14-year-old girl comes into your office for a routine sports physical. She has been your patient since birth, and has seen you every year or two for the usual childhood illnesses and health exams. Her history is unremarkable, except that when you ask her whether she’s ever smoked, she confides in you that she occasionally smokes a cigarette with her girlfriends—something, she says, her parents know nothing about.

She tells you that she began smoking 2 months ago, but doesn’t smoke much—only about 3 cigarettes a

week. She denies using any other form of tobacco (eg, smokeless tobacco) and tells you that she has not experimented with drugs.

When you ask her whether she’s tried to stop smoking, she tells you that she has, but that she’s already failed at several attempts to quit. You question her further and uncover some signs and symptoms of nicotine addiction, including cravings and a feeling of irritability when she isn’t able to smoke.

“Am I addicted to nicotine?” she asks you. But before you get a chance to respond, she continues: “And how is that possible? I don’t even smoke that much!”

Hooked from the first cigarette?

You bet.

Very soon after that first cigarette, adolescents can experience a loss of autonomy over tobacco, and recent research indicates that this loss of autonomy may play a key role in nicotine addiction.¹

The challenge we face, though, is that many young patients think there’s no harm in trying a cigarette once. After all, what could be the problem with that? But there is a big risk to smoking just once and family physicians need to drive this message home to adolescent patients. A 10-point checklist can help.

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■ 10 questions that can open an adolescent's eyes

The "Hooked On Nicotine Checklist" (**PATIENT HANDOUT**) is an objective measure of a patient's loss of autonomy and it can be a real eye opener for adolescents. Simply give it to your adolescent patients and ask them to answer the 10 questions with a Yes or No answer.

A Yes response to any of the 10 questions indicates a loss of autonomy. The number of Yes responses gives an indication of the severity of the dependence, and may help to motivate adolescent smokers to quit. (Seven is the mean for adult smokers.) A smoker loses full autonomy when the sequelae of tobacco use present an obstacle to quitting—that is, when quitting requires an effort or results in discomfort.

Studies find that one cigarette is all it takes

Studies on a cohort of 7th graders found that every symptom on this validated checklist¹ had been experienced by at least one young person within weeks of starting to smoke, sometimes after the first cigarette.^{2,3} These results have been replicated many times.⁴⁻⁷

Three New Zealand national surveys involving 25,722 adolescent smokers who used this checklist revealed a loss of autonomy in 25% to 30% of young people who had smoked their one and only cigarette during the preceding month.⁶

In another study using *Diagnostic and Statistical Manual of Mental Disorders-IV* criteria, 35% of young people who had symptoms of dependence had been smoking for one month or less when the first symptom appeared,⁵ challenging the assumption that addiction requires years of smoking. These studies also challenge the belief that repetition is the force that causes addiction, as at least one quarter had symptoms after one cigarette.

Expert opinion has also held that people who smoke fewer than 5 cigarettes daily are rarely addicted. Research data, however, indicate that 50% of young

people were hooked on tobacco prior to smoking at a rate of 2 cigarettes per week.^{3,7} These results have also been replicated.⁴⁻⁷ Loss of autonomy has been reported even prior to the onset of smoking once per month.^{4,8}

Which adolescents are most vulnerable?

About one quarter of young people experience the FIRE (First-Inhalation-Relaxation-Experience), a sensation of relaxation the first time they inhale from a cigarette, and this sensation predicts continued smoking.⁹ FIRE is the strongest predictor of the progression to the loss of autonomy and a diagnosis of tobacco dependence.¹⁰ One study demonstrated that an alarming 91% of those with the FIRE subsequently lost autonomy.¹⁰ FIRE appears to be a symptom of the neurological events that trigger addiction with the first cigarette.¹⁰

What happens in the brain after just one smoke?

As you would expect, long-term smokers have higher concentrations of nicotine receptors in the brain, according to autopsy studies,¹¹ but what happens to the brain after, say, just one cigarette? A study by Dr Abreu-Villaca and colleagues revealed that there is an increase in nicotine receptors in the brain the day after the first dose of nicotine. The take-home message: It only takes a day for the brain to remodel itself in response to one dose of nicotine.¹²

■ It's time to revisit our beliefs about withdrawal

Just as we have been taught that people who smoke just a few cigarettes daily are rarely addicted, so too, have we been taught that occasional smokers are unlikely to experience withdrawal symptoms. Our understanding has been that smokers who experience withdrawal must smoke frequently enough to maintain nicotine in the blood throughout

FAST TRACK

The only sure way to avoid addiction is to never smoke that first cigarette

PATIENT HANDOUT

Hooked On Nicotine Checklist

Are you skeptical that addiction can begin so quickly, after just a few cigarettes? Then complete this checklist.

A Yes response to any of the questions means you are already addicted to cigarettes. The number of Yes responses indicates how dependent you are on them.

	Yes	No
1. Have you ever tried to quit smoking, but couldn't?	<input type="checkbox"/>	<input type="checkbox"/>
2. Do you smoke <i>now</i> because it is really hard to quit?	<input type="checkbox"/>	<input type="checkbox"/>
3. Have you ever felt like you were addicted to tobacco?	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you ever have strong cravings to smoke?	<input type="checkbox"/>	<input type="checkbox"/>
5. Have you ever felt like you really needed a cigarette?	<input type="checkbox"/>	<input type="checkbox"/>
6. Is it hard to keep from smoking in places where you are not supposed to, like school?	<input type="checkbox"/>	<input type="checkbox"/>

When you tried to stop smoking (or, when you haven't used tobacco for a while):

7. Did you find it hard to concentrate because you couldn't smoke?	<input type="checkbox"/>	<input type="checkbox"/>
8. Did you feel more irritable because you couldn't smoke?	<input type="checkbox"/>	<input type="checkbox"/>
9. Did you feel a strong need or urge to smoke?	<input type="checkbox"/>	<input type="checkbox"/>
10. Did you feel nervous, restless, or anxious because you couldn't smoke?	<input type="checkbox"/>	<input type="checkbox"/>

FAST TRACK

The "Hooked On Nicotine Checklist" can help motivate adolescent smokers to quit

their waking hours. With nicotine's two hour half-life, this typically requires 5 cigarettes per day. In fact, some years ago, *The New England Journal of Medicine* published a proposal that cigarettes could be rendered practically non-addictive if their nicotine content was lowered to the point where smokers would not be able to obtain as much nicotine as was delivered by 5 ordinary cigarettes.¹³

But a growing body of literature paints a different picture. We now know that tobacco withdrawal does, indeed, occur in those who do not smoke daily

or who smoke fewer than 5 cigarettes per day.^{6-8,14-20}

In fact, a survey of adult smokers found that adults who smoked only a few cigarettes weekly found quitting to be difficult; they experienced withdrawal symptoms, which some rated as unbearable.²¹ Most of these self-described "social smokers" were addicted to tobacco.

Timing of withdrawal is different for novice smokers

Although the *Diagnostic and Statistical Manual of Mental Disorders-IV-TR* defines nicotine withdrawal as beginning

within 24 hours of the last cigarette, the timing of withdrawal had been studied only in heavy smokers. It was surprising to find in an as yet unpublished survey that my colleagues and I conducted that some high school smokers experienced withdrawal symptoms that did not appear until *a week* after their last cigarette. This period of time is defined as the *latency to withdrawal*, or the time from the last cigarette to the onset of withdrawal.²² When novice smokers first experience withdrawal symptoms, the latency to withdrawal is very long, allowing them to remain comfortable for a week or more between cigarettes.

How could a single cigarette keep withdrawal symptoms at bay for far longer than the 12 hours it takes to eliminate nicotine from the body? We don't know what the answer is for humans, but we do know that in rats, the first dose of nicotine increases noradrenaline synthesis in the hippocampus for at least 30 days after the nicotine is gone.²³ Given this information, it is quite plausible, then, that a few puffs from a cigarette could suppress withdrawal for many days, and perhaps even several weeks.

Research I conducted—and which I'll describe in greater detail, in a bit—supports the notion that the latency to withdrawal period may shrink over time. The realization that the latency to withdrawal changes over time fundamentally alters our understanding of addiction.

Revisiting long-held beliefs of addiction and tolerance

The shortening of the latency to withdrawal is called dependence-related tolerance.²⁴ One can think of dependence-related tolerance as either a diminution in the duration of withdrawal relief afforded by one cigarette, or conversely, a requirement to smoke more frequently to maintain comfort. The latency to withdrawal cannot shorten if there is no withdrawal. Therefore, dependence-related tolerance develops only after withdrawal symptoms are present.

Although we were all taught in medical school that tolerance precedes and causes addiction, addiction must be present before dependence-related tolerance can develop.

Nicotine leaves an indelible mark

To test this dependence-related tolerance hypothesis, my colleagues and I surveyed 2000 people who were smoking in public places, including the areas outside of our hospital's entrance. We asked about their longest period of abstinence, how much they smoked before quitting, and how much they smoked at various times after resuming smoking. By plotting these data on a graph, we were able to see that dependence-related tolerance has 2 components, one reversible and the other permanent (irreversible).^{24,25}

The permanent component can cut the duration of a cigarette's effect to half its original length, then to a quarter, to an eighth, a sixteenth, a thirty-second, a sixty-fourth and so on.

The reversible component reduces what is left by about half again.

So if we consider only the permanent component, it would cut the duration of effect from, say, four weeks to two weeks (one "cut"), then from two weeks to one week (second cut), from one week to 3.5 days (third cut), and so on. On top of this, the reversible component halves it again.

After 3 months of abstinence, then, the reversible component of tolerance disappears (temporarily) and a relapsed pack a day smoker will be happy—for a time—smoking a half-pack (10 cigarettes) per day. But then the reversible component kicks in and they're back to smoking a pack a day.

The take-home message? Long-term smokers' brains will never return to the days when their addiction could be satisfied with one cigarette per month because of the permanent component of tolerance.

FAST TRACK

35% of young people who had symptoms of dependence had been smoking for one month or less when the first symptom appeared

TABLE 2

The 5 A's of smoking cessation²⁶

- Ask about smoking.
- Advise quitting.
- Assess current willingness to quit.
- Assist quit attempt.
- Arrange timely follow-up.

How to help light smokers like your young patient

The fact that loss of autonomy over tobacco can occur after 1 cigarette helps explain the clinical observation that it is difficult for even non-daily smokers to stop smoking completely.

Helping a 14-year-old patient like the one in the opener to quit smoking requires that you not underestimate your patient's need for advice about cessation. Unfortunately, none of the medications for smoking cessation, such as varenicline or bupropion, have been approved for this purpose in patients under the age of 18.

As a result, you'll need to help young patients formulate a quit plan, just as you would with an adult heavy smoker. Give them the "Hooked On Nicotine Checklist." The answers will help you both to tailor the quit plan to the obstacles they face. You'll also need to provide young patients with anticipatory guidance about what they can expect from nicotine withdrawal.

Don't wait for adolescents to broach the subject

Early intervention requires that you ask patients who are 10 years of age or older about smoking (TABLE 2). Be sure to take advantage of teachable moments and tell young patients just how addictive smoking can be—even if they've only smoked 1 or 2 cigarettes.

Your conversation might go like this:

The first cigarette you smoke changes your brain and may cause you to develop

a craving for nicotine that could be hard to resist. The only sure way to avoid addiction is to never smoke that first cigarette.

If you are already smoking and you have a craving for a cigarette every once in a while, that is a sure sign of addiction. The sooner you quit, the better your chances of succeeding. Now let's work on a quit plan that will help you do that. ■

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It takes only a day for the brain to remodel itself in response to one dose of nicotine

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