NTS Handbook for Tobacco Dependence and Withdrawal

A guide for stop smoking practitioners

National Training Service

Contents

The importance of explaining tobacco dependence and withdrawal

Providing your clients with a simple understanding of why they smoke and might find it difficult to stop will assist them in their journey to stopping smoking.

We will provide you with some technical detail about why tobacco is addictive, and some simple ways to describe this to your clients.

Throughout this document we refer to 'tobacco dependence' instead of 'nicotine dependence'. The terms can be used interchangeably. Although it is nicotine that is primarily responsible for getting someone hooked on tobacco there are other factors involved in using tobacco that may play a role. Therefore we talk about tobacco dependence.

Being thoroughly familiar with the tobacco withdrawal sympton and their expected duration is vital to helping people stop smoking.

You don't need to tell your clients of every symptom in detail, but instead let them know to expect some discomfort in the early stages of the quit attempt. They are likely to experience some tobacco withdrawal symptoms, but the good news is that these do not last long.

Assessing the occurrence and severity of withdrawal symptoms and ways in which the client has coped with these will also help guide treatment.

Why do people smoke? The technical detail

Let's start with some of the technical detail so you have an understanding of what's going on.

Most people start smoking for social reasons – peer pressure, influence of parents and whanau, to help people socialise, etc. Some people, women in particular, report starting smoking as a way of controlling body weight.

People continue to smoke because they become dependent on, or addicted to, nicotine.

Nicotine is present in the leaves of tobacco plants. When the tobacco is smoked the nicotine is carried down into the lungs and absorbed through the lining of the lungs into the blood and is then carried to the heart. From the heart the nicotine travels to the brain, and around to the rest of the body.

Nicotine, like other drugs such as cocaine and amphetamines whose use can result in dependence, acts on reward pathways in the brain. With repeated use over time, the brain adapts and comes to rely on these drugs.

How does nicotine act on the reward system?

The human nervous system is a complex system to nerve cells (neurons) which transmit signals all over the body. Neurons communicate with each other via chemicals called neurotransmitters. These chemicals essentially 'ferry the signals' from one neuron to another.

The neurotransmitter is released from the end of the neuron and attaches to specific receptors on the next neuron and 'passes on' the message. The neurotransmitter and receptors act like a key in a lock.

In the first instance, neurons found in a part of the brain called the Ventral Tegmental Area connect to another area of the brain called the nucleus accumbens.

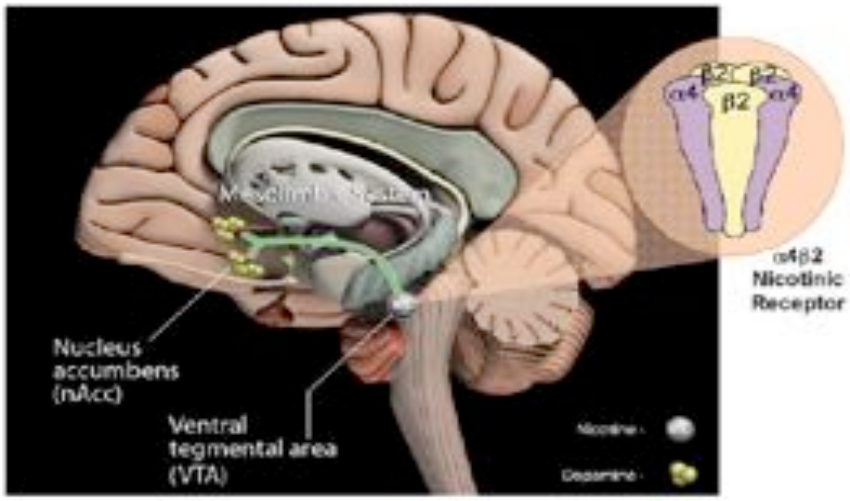


Figure 1: We are grateful to ASH UK, for permission to use this diagram, which is from: ASH UK guidance notes on varenicline 2007.

These neurons are activated by a neurotransmitter called acetylcholine. When acetylcholine (the key) attaches to acetylcholine receptors (the lock) it creates an impulse that results in the release of dopamine in the nucleus accumbens. It is the release of dopamine in this part of the brain that produces the 'reward'.

It just so happens that nicotine also attaches to these acetylcholine receptors (for this reason they are referred to as nicotinic-acetylcholine receptors). So, when a person smokes tobacco, nicotine travels to the brain, attaches to these nicotinic-acetylcholine receptors and causes dopamine to release in the nucleus accumbens, which makes smoking rewarding.

Over time the brain becomes used to regular doses of nicotine, and comes to 'need' it. This need is similar to a need to eat. This need can be kept away for a while if you distract yourself or keep yourself busy (very similar to hunger), however it's harder to resist if you're bored or constantly thinking about what you're missing.

Going without smoking (and nicotine) results in nicotine withdrawal, and people can experience any number of withdrawal symptoms. It is the occurrence of these symptoms that can undermine the quit attempt.

Tobacco use and dependence: It's not *just* about the nicotine

Of course people would not become addicted if tobacco did not contain nicotine, however there are other factors that contribute to people starting smoking and continuing to smoke, even if they want to stop. There are a number of other factors that work with nicotine to create dependence on tobacco. These other factors are related to:

1. The person's beliefs about smoking (e.g. relieves their stress, helps them cope)

Their identity as a:
• Smoker • Mental health • Personality • Coping skills • Their need to avoid withdrawal symptoms • Individual biochemistry,

2. The person's lived reality (e.g. stress, access to drugs, social pressure society views, etc.)

A person's motivation to smoke is then influenced by both their need to smoke (e.g. the hunger for nicotine and the need to keep withdrawal symptoms at bay) and their want to smoke. Their want to smoke is influenced by their plans to smoke, positive evaluations of smoking (e.g. their identity as a smoker, beliefs about the benefits of smoking) and also their anticipated pleasure.

For someone to stop smoking, the need and want "not to smoke" must outweigh the need and want "to smoke". We can work on both sides – **increasing** the need and want **not to smoke** and **decreasing** the need and want **to smoke**.[1]

Tobacco smoke is a good source of sensory stimuli (smell, taste, feel in throat, etc.). When these are paired with nicotine, and dopamine release in the nucleus accumbens, they may become secondary reinforcers. These secondary reinforcers become rewarding on their own. It is clear that nicotine is required for the maintenance of smoking behaviour, but the non-nicotine factors associated with smoking may enhance its effects.

Did you know?

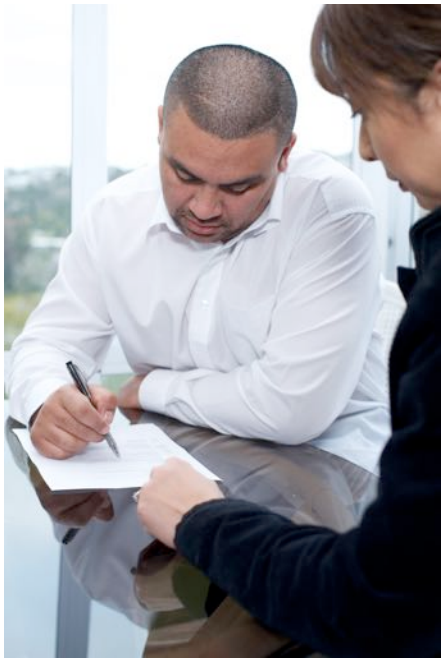
Although nicotine is a mild stimulant it does not have the same positive effects as other drugs of dependence. In larger doses it is associated with side effects such as nausea, and vomiting. People who smoke develop a tolerance to these effects but they also carefully regulate their nicotine intake by altering the way in which they smoke each cigarette (e.g. number of puffs, puff volume, inhalation time).

Over time there is an increase in the number of nicotinic acetylcholine receptors in parts of the brain. This is called neuroadaptation. When people stop smoking the numbers of these receptors return to the levels seen in non-smokers within several weeks.[3]

Assessment of tobacco dependence

Measuring the degree of dependence can help identify how people who smoke may benefit from extra assistance to stop.

In the past cigarette consumption (e.g. number of cigarettes smoked per day) was commonly used. It is easy to measure but does not always correlate well with blood nicotine levels. Smokers may reduce their cigarette consumption but this may not change their blood nicotine levels due to compensatory smoking (e.g. smoking more from each cigarette).



Fagerstrom Test for Nicotine Dependence

Most research studies assess tobacco dependence using the Fagerstrom Test for Nicotine Dependence (FTND).[4] It consists of six questions (see Appendix 1) that are scored and summed. The higher the score the more tobacco dependent a person is, however a low score does not imply that people do not benefit from support to help them stop.

Using time to first cigarette of the day is an easier way

You can more simply assess a person's degree of tobacco dependence by asking this question:

> ***"How soon after you wake up do you smoke your first cigarette?"***

If the smoker has their first cigarette within 60 minutes of waking then they are more highly dependent smokers. This assessment also has practical implications, for example when prescribing nicotine gum or lozenges those who smoke within 60 minutes of waking should be recommended to take the higher dose product.

Biochemical tests

Dependence can also be assessed via biochemical tests that provide an objective measure. The concentration of nicotine (and cotinine – a metabolite of nicotine) can be measured in blood, urine and saliva to provide an accurate measure of the amount of nicotine that has been consumed.

Figure 2: Example of a Carbon Monoxide monitor: piCO+ smokerlyzer.

The fastest objective assessment is to measure the concentration of carbon monoxide in the smoker's expired breath. To do this a CO monitor is used. Although this is not as accurate as measuring nicotine or cotinine it is a very simple test to perform, does not involve the handling of body fluids and also provides bio-feedback to the smoker.

Carbon monoxide (CO) monitors are portable, easy to use, and are a useful tool for immediate feedback to the person who smokes. They can also be used as a motivational tool. People who smoke are generally interested to see how their CO level changes once they stop smoking.

Withdrawal symptoms

When people who smoke go without tobacco a number of mood and physical symptoms can develop (page 10). From a treatment perspective individual variation in withdrawal symptoms is important.

Many people who smoke suffer with withdrawal symptoms and some find these distressing.[5] Some people who smoke report that withdrawal symptoms cause significant impairment in social, occupational, or other important activities of daily living.[6]

However, tobacco withdrawal symptoms are mostly short-lived and people withdrawing from tobacco can be reassured that these should disappear within 4-6 weeks.[7]

Urges to smoke usually last longer, but do decrease in frequency and people can learn to manage these.

Urges to smoke are typically triggered by cues such as stress, social situations, or when drinking alcohol. Urges to smoke do pass and can be controlled. The key piece of advice is not to give into these urges and instead adopt strategies to cope with these. Strategies might include distraction techniques, exercise, and avoidance of risky situations.

Increased appetite can also last for longer than 6 weeks. Also related to this is weight gain. People typically gain around 5kg on average in the first year of abstinence. However stop smoking medications can reduce this weight gain, for at least as long as it is used. This can help reassure those who are concerned about gaining weight and stopping smoking at the same time.

People who smoke with co-morbidities such as diabetes and obesity may need special attention regarding weight gain during their quit attempt.

Having some knowledge of the typical time course of withdrawal symptoms will help you to help people get through the initial stages of the quit attempt.

Tobacco withdrawal chart

Tobacco withdrawal – mood and physical symptoms	
Symptom/physical sign	**Average duration**
Depressed mood	Up to 4 weeks
Sleep disturbance	Up to 2 weeks
Irritability	Up to 4 weeks
Difficulty concentrating	Up to 2 weeks
Restlessness	Up to 4 weeks
Increased appetite and increased weight	Up to 10 weeks
Constipation	Up to 4 weeks
Mouth ulcers	Up to 4 weeks
Light-headedness	Up to 2 days
Urges to smoke	Up to 10 weeks

Sources: [8-12]

Symptoms that are ***not*** related to tobacco withdrawal

- Headache
- Chest pain
- Blurred vision
- Decreased sense of smell
- Skin rash
- Sweating
- Palpitations
- Tremor
- Fatigue

When people stop smoking they also have:

- A decrease in heart rate
- An increase in skin temperature
- A decrease in the metabolism (break down) of some medicines.

Some stop smoking practitioners like to use the term 'recovery symptoms' instead of 'withdrawal symptoms'. Use what suits you best.

Changes in drug metabolism

Smoking and stopping smoking have an effect on the metabolism of a number of medicines.

Tobacco smoke contains substances, such as polycyclic aromatic hydrocarbons, which cause increased activity of a number of liver enzymes. These are responsible for breaking down a range of medicines.[13,14]

Therefore, medicines metabolized by these enzymes are broken down faster and can result in reduced blood concentrations. When a person stops smoking the enzyme activity slows down which *may* result in increased blood levels of these medicines.

Although stopping smoking can affect a range of medicines, not all of these changes are clinically relevant.

The medicines to watch out for are **warfarin**, **theophylline**, **clozapine** and **olanzapine**:

Warfarin

Warfarin is an anti-coagulant medicine and used for 'thinning the blood'. There is evidence that stopping smoking can lead to an increase in the blood level of warfarin, with an associated increase in INR.[15-17]

The INR is a test of blood clotting, which is used to monitor warfarin therapy. If the INR rises too high there is a risk of bleeding and haemorrhage.

People who are on warfarin will have their INR measured regularly. However you should advise your clients who are using warfarin to get their INR checked after two weeks of stopping smoking.

Theophylline

Theophylline is a drug that is used for the treatment of respiratory disease such as asthma. It acts to dilate the airways making breathing easier.

Smoking and stopping smoking affects theophylline levels.[18,19] Smoking speeds up the metabolism of theophylline and stopping smoking has the opposite effect; meaning that theophylline levels could rise and clients may start experiencing adverse effects.

People who are on theophylline will have their blood levels checked regularly. However you should advise your clients who are using theophylline to see their GP to get their blood checked within two weeks of stopping smoking.

Clozapine and Olanzapine

Clozapine and olanzapine are anti-psychotic medicines that people with schizophrenia might be using.[13,20]

There is evidence to show that increased blood levels of these medicines can occur following stopping smoking.

Some experts have recommended doses of clozapine and olanzapine need to be reduced by approximately 35% when people stop smoking.[21]
A reduction in cigarette consumption does not require dosage adjustment.

People using these medicines will already have these medicines monitored on a regular basis. However you should advise your clients, or discuss with their mental health worker, that levels should be checked once they have stopped smoking.

There are a number of other medicines used for treating mental illness that may be affected by stopping smoking. You can refer to the New Zealand Guidelines for Helping People to Stop Smoking for further details: http://www.health.govt.nz/publication/new-zealand-guidelines-helping-people-stop-smoking

Finally, you will note that smoking speeds up the metabolism of coffee, therefore when people stop smoking they may want to consider reducing the amount of coffee that they drink.

Explaining tobacco dependence and withdrawal to your clients

Explaining how tobacco dependence develops and why people continue to smoke is useful to provide the client with a clear understanding of what they need to overcome, for example their withdrawal symptoms, and the power of tobacco and tobacco dependence.

> *"When you first start smoking regularly your brain changes so that it expects regular doses of nicotine. This need for nicotine from tobacco can undermine your motivation to stop smoking".*
>
> *"When you do go without smoking your brain is missing its regular dose of nicotine, and people typically experience a range of symptoms".*
>
> *"The good news is that these symptoms are relatively short-lived and should disappear within 4-6 weeks".*
>
> *"The longer you go without a cigarette the easier it will become!"*
>
> *"Although it can be a bit tough in the first few weeks, people find it easier the longer they go without a single puff. Your body will start getting used to life without nicotine and you'll feel normal again in a short time".*
>
> *"Remember you won't be going through this alone. I'll be helping you to find some ways to cope with, and reduce, your withdrawal symptoms and to use your medication properly (e.g. the right amount and for long enough) to make stopping easier".*

Using the monster on the shoulder analogy to help get this information across

When explaining tobacco dependence and withdrawal it is sometimes useful to use an analogy. Here's how the 'monster on your shoulder' analogy goes:

Smoking is like having a monster on your shoulder. It gets hungry whenever you go without smoking and starts to scream out for a smoke 'Feed me, feed me!' Its scream gets louder and louder until you smoke.

Within a few puffs, it quietens down and you feel so much more relaxed that this awful screaming has gone away. However one cigarette does not last long and within an hour or two the monster is screaming out again. You feed it, it settles down and so the cycle goes on and on.

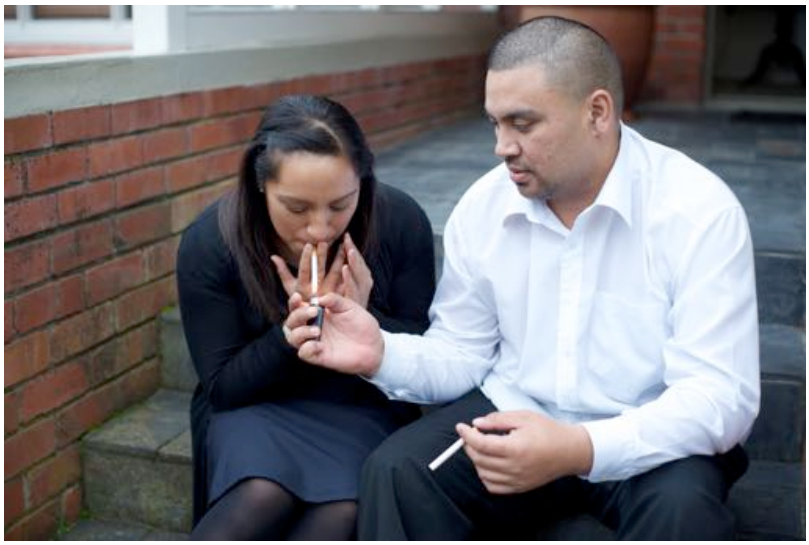
Unfortunately you can't kill the monster but you can put it to sleep. How? By starving it completely of cigarette smoke – not even a single puff. One puff is enough to wake it up and it will be back screaming in your ear for more.

"The good news is that it does not take long for this monster to fall asleep. For most people the worst time is in the first few weeks of stopping. Once you learn to start living smokefree it becomes much easier."

What if someone does have a puff?

This is of course a common scenario and is not the end of the world. You will often hear tobacco dependence described as a chronic relapsing condition.

You should stress to people that the aim is to not have a single puff, but a slip does not mean that they've 'blown' the attempt to stop. Make sure that they know that they can come back and see you (or call back and talk to you) no matter what happens. You're not there to judge, just to help them succeed.



When explaining all of this to your clients it is sometimes easier to talk about addiction to tobacco instead of addiction to nicotine. This is because:

a) Tobacco contains more than just nicotine, and although nicotine is the main substance that person who smokes gets hooked on, there are likely to be other things at work (e.g. the physical act of smoking and other substances in smoke that might increase the effects of nicotine); and

b) Some clients get worried about getting hooked on nicotine replacement therapy and this fear could limit its effective use.

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Appendix 1

Fagerstrom Test for Nicotine Dependence (FTND)

Assessment Questions	
1. How soon after you wake up do you smoke your first cigarette? ☐ Within 5 minutes = 3 ☐ 6-30 minutes = 2 ☐ 31-60 minutes = 1 ☐ After 60 minutes = 0	Score ☐
2. Do you find it difficult to refrain from smoking in places where it is forbidden? ☐ Yes = 1 ☐ No = 0	Score ☐
3. Which cigarette would you find most challenging to give up? ☐ The first one in the morning = 1 ☐ Any other = 0	Score ☐

4. How many cigarettes per day do you smoke?

Score

- ☐ Up to 10 = 0
- ☐ 11 – 20 = 1
- ☐ 21 – 30 = 2
- ☐ Over 30 = 3

5. Do you smoke more frequently during the first hours after waking than during the rest of the day?

Score

- ☐ Yes = 1
- ☐ No = 0

6. Do you smoke if you are so ill that you are in bed most of the day?

Score

- ☐ Yes = 1
- ☐ No = 0

Total score