Medscape

Nicotine Addiction

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Overview

Practice Essentials

Nicotine addiction is the second-leading cause of death worldwide, and the leading cause of preventable death. Cigarette smoking is responsible for more than 480,000 deaths per year in the United States, including more than 41,000 deaths resulting from secondhand smoke exposure. This is about one in five deaths annually, or 1,300 deaths every day.[1]

Signs and symptoms

The time to first cigarette and total cigarettes per day are the 2 strongest predictors of nicotine addiction.

The physical effects of nicotine use include accelerated heart rate, increased blood pressure, and weight loss.

In addition to its physical effects, nicotine exerts a strong behavioral influence. Nicotine may enhance an individual's level of alertness, although tobacco abuse and dependence may simulate a frantic, almost manic, picture. Speech may also be accelerated in line with behavior. Cessation after prolonged tobacco use can contribute to irritability, which is often soothed by a dose of nicotine.

See Clinical Presentation for more detail.

Diagnosis

Nicotine addiction is now referred to as tobacco use disorder in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5).[2]

There are 11 possible criteria, of which at least 2 must be present in the last 12 months:

1. Tobacco taken in larger amounts or over longer periods of time

2. Persistent desire or unsuccessful efforts to cut down or control use

3. A great deal of time is spent on activities necessary to obtain or use tobacco

4. Craving or a strong desire or urge to use tobacco

5. Recurrent tobacco use resulting in a failure to fulfill major role obligations at work, school, or home

6. Continued tobacco use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by effects of tobacco (eg, arguments with others about tobacco use)

7. Important social, occupational, or recreational activities are given up or reduced because of tobacco use

8. Recurrent tobacco use in situations in which it is physically hazardous (eg, smoking in bed)

9. Tobacco use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by tobacco

10. Tolerance, as defined by one of the following:

a. The need for markedly increased amounts of tobacco to achieve the desired effect

b. A markedly diminished effect with continued use of the same amount of tobacco

11. Withdrawal, as manifested by either of the following:

a. The characteristic withdrawal syndrome for tobacco

b. Tobacco (or a closely related substance, such as nicotine) is taken to relieve or avoid withdrawal symptoms

See Workup for more detail.

Management

Tobacco use remains the single largest preventable cause of death and disease in the United States.

Nicotine replacement therapy

Nicotine replacement therapy (NRT) works by making it easier to abstain from tobacco by partially replacing the nicotine previously obtained from tobacco.[3] All of the commercially available forms of NRT increase the chances of successful smoking cessation. Overall, NRT increases the quit rate by 50-70%, and the increase appears to be independent of any additional support provided.

Types of NRT products on the market today include the following:

- Transdermal nicotine patch
- Nicotine nasal spray
- Nicotine gum
- Nicotine lozenge
- Sublingual nicotine tablet
- Nicotine inhaler

Non-nicotine pharmacotherapy

The medications bupropion and varenicline have demonstrated efficacy for smoking cessation.

Bupropion acts by alleviating some of the symptoms of nicotine withdrawal. Like NRT products, bupropion has been endorsed by the US Clinical Practice Guideline as a first-line therapy.[4] Compared with placebo, bupropion approximately doubles smoking cessation rates, and it is equally effective for men and women.

Varenicline is a partial agonist that is selective for alpha-4, beta-2 nicotinic acetylcholine receptors (nAChRs). The drug helps smokers quit by preventing withdrawal symptoms while moderate levels of dopamine are maintained in the brain.

Some reviews have found that patients receiving varenicline are at an increased risk for serious adverse cardiovascular events. On the basis of study findings, extreme caution should be used when considering varenicline for patients with known cardiovascular problems.

Combination treatment with varenicline and bupropion may be more effective than single-drug therapy for smoking cessation in those smokers motivated to quit.

See Treatment and Medication for more detail.

Background

Nicotine addiction is the second-leading cause of death worldwide. The important causes of smoking-related mortality are atherosclerotic vascular disease, cancer, and chronic obstructive pulmonary disease (COPD). Smoking also can contribute to other diseases, such as histiocytosis X, respiratory bronchiolitis, obstructive sleep apnea, idiopathic pneumothorax, low birth weight, and perinatal mortality.

Currently, there are about 1.3 billion smokers the world, most (84%) of them in developing countries.[5] Worldwide, tobacco use causes nearly 6 million deaths per year, and current trends show that tobacco use will cause more than 8 million deaths annually by 2030. Through direct healthcare costs and loss of productivity from death and illness, tobacco will cost

governments an estimated US $200 billion per year. A third of these costs will be borne by the developing countries. Many factors have led to increased global smoking rates, including the following:

- Trade liberalization
- Direct foreign investment
- Global marketing
- Transnational tobacco advertising, promotion, and sponsorship
- International tobacco smuggling

Research investigating why people smoke has shown that smoking behavior is multifaceted. Factors influencing initiation of smoking differ from those influencing maintenance of smoking behavior. Nicotine dependence, genetic factors, and psychosocial factors all influence maintenance of smoking behavior.

Nicotine in cigarette smoke affects mood and performance and is the source of addiction to tobacco. It meets the criteria of a highly addictive drug, in that it is a potent psychoactive substance that induces euphoria, reinforces its own use, and leads to nicotine withdrawal syndrome when it is absent. As an addictive drug, nicotine has 2 very potent effects, being both a stimulant and a depressant. Thus, cigarettes may both get a smoker going in the morning and “chill out” the smoker during the day.

All healthcare professionals should be aware of the risks of tobacco smoking, understand nicotine addiction, and assist patients with smoking cessation.

In their 2010 guidelines, the American Heart Association (AHA) and the American Stroke Association (ASA) strongly recommended that smokers consider smoking cessation because of the direct correlation between smoking and both ischemic stroke and subarachnoid hemorrhage. Clinicians should provide counseling, nicotine replacement, and oral smoking cessation medications as options. Avoiding exposure to environmental tobacco smoke is reasonable.[6]

Illustrative case study

A young adult man met his primary care physician for the first time, during which his prior military history came to light. The young man recalled the anxiety he experienced when he received his military orders for deployment to Iraq. Before being notified of deployment, he smoked cigarettes only occasionally, perhaps 1 or 2 cigarettes a day.

As the time for deployment approached, the young man started smoking more cigarettes, and by the time he arrived in Iraq, he was up to a full pack a day. Throughout the 12-month deployment, the soldier steadily increased his smoking, reaching a peak consumption of nearly 40 cigarettes a day. He sustained several significant combat-related traumas resulting in mild physical injuries.

After returning home, the young man completed his military obligation and left the service. Although experiencing some lingering physical and emotional pain from his tour of duty, he was improving, except in 1 area: He continued to smoke 2 packs a day, despite efforts to quit. The former soldier’s wife complained that the expensive habit was creating an unnecessary financial strain on their meager resources. Furthermore, the young man himself no longer derived much pleasure from smoking, admitting that only the first cigarette of the day was truly enjoyable.

Despite his apparent willingness to consider quitting the use of tobacco, the former soldier also readily admitted that he was frightened by the prospect. He recognized that his unresolved emotional issues from the war, though currently being addressed in treatment, gave him a reason not to tackle another problem at this time. The doctor appreciated the frank disclosure but took issue with the patient’s conclusion. The patient appeared motivated and open to change but needed additional encouragement to consider a smoking cessation program.

At this point, the doctor decided to discuss concomitant disorders by explaining the common association of a mental disorder with substance misuse. The doctor further explained how tobacco use, at least in the beginning, helped the former soldier cope with anxiety. Trauma suffered in the war led to the developed of posttraumatic stress disorder (PTSD). The continued use of tobacco made it difficult to distinguish the symptoms of nicotine dependence from those of PTSD and delayed recovery from the emotional disorder.

The doctor asked the patient to think about this information and consider a smoking cessation program. Various medications were described that could alleviate nicotine withdrawal symptoms or reduce tobacco cravings. Such medications, combined with a behavioral strategy, offered the safest and surest route to a tobacco-free life. Discussions continued over a few more visits (including a meeting with the wife) before the patient decided to give up smoking. With the doctor’s help, he successfully completed a 3-month smoking cessation program.

Pathophysiology

Nicotine exerts its neurophysiologic action principally through the brain's reward center. This neuroanatomic complex, otherwise known as the mesolimbic dopamine system, stretches from the ventral tegmental area to the basal forebrain. The nucleus accumbens, a dopamine-rich area, is an intersection where all addictive behaviors meet. The release of dopamine at this site promotes pleasure and reinforces the associated behaviors, such as the use of alcohol and drugs, to replicate the positive experience.

Other factors may also promote nicotine dependence, such as nicotine's reduction in the monoamine oxidase inhibitor enzyme. This enzyme is involved in the metabolism of catecholamines, including dopamine. The net effect would be a lingering presence of the stimulating dopamine at the nucleus accumbens.[7]

A closer inspection of nicotine's neurophysiology reveals a much more complex system. In particular, researchers continue to study the brain's neuronal nicotinic acetylcholine receptors (nAChRs).The nAChRs play a central role in nicotine's widespread influence on brain chemistry.

Researchers have identified several nAChR subtypes, broadly classified in terms of alpha and beta subunits; the alpha-4 and beta-2 subunits are the most widely expressed in the brain. Acting through the nAChRs, nicotine influences glutamate, gamma-aminobutyric acid (GABA), acetylcholine, dopamine, norepinephrine, and serotonin.[8]

Nicotine also releases corticosteroids and endorphins that act on various receptors in the brain. Nicotine use results in more efficient processing of information and reduction of fatigue. In addition, nicotine has a sedative action, reduces anxiety, and induces euphoria. Nicotine effects are related to absolute blood levels and to the rate of increase in drug concentration at receptors.

Nicotine stimulates the hypothalamic-pituitary axis; this, in turn, stimulates the endocrine system. Continually increasing dose levels of nicotine are necessary to maintain the stimulating effects. With regards to dependence, some experts rank nicotine ahead of alcohol, cocaine, and heroin. A teenager who smokes as few as 4 cigarettes might develop a lifelong addiction to nicotine.

Small, rapid doses of nicotine produce alertness and arousal, as opposed to long-drawn-out doses, which induce relaxation and sedation. Nicotine has a pronounced effect on the major stress hormones. It stimulates hypothalamic corticotropin-releasing factor (CRF), and it increases levels of endorphins, adrenocorticotropic hormone (ACTH), and arginine vasopressin in a dose-related manner. Corticosteroids also are released in proportion to plasma nicotine concentration.

Nicotine alters the bioavailability of dopamine and serotonin and causes a sharp increase in heart rate and blood pressure. It acts on brain reward mechanisms, both indirectly (through endogenous opioid activity) and directly (through dopamine pathways).

A cigarette delivers 1.2-2.9 mg of nicotine, and the typical 1 pack–per-day smoker absorbs 20-40 mg of nicotine each day, raising the plasma concentrations to between 23-35 ng/mL. Nicotine addiction results from positive reinforcement (with the administration of nicotine) and withdrawal symptoms that start within a few hours of the last cigarette.

Association with depression

The association between depression and smoking is well established. A lifetime history of major depression is more than twice as common in people who smoke than in people who do not. A history of major depressive disorder (MDD) is associated with a decreased ability to quit smoking and an increased likelihood of smoking relapse.

As shown by the National Institute on Alcohol Abuse and Alcoholism's National Epidemiologic Survey on Alcohol and Related Conditions, current daily smokers with lifetime MDD and current MDD were more likely to report a continuation of smoking than those without a diagnosis of MDD. Former daily smokers with current MDD were also less likely to report continued abstinence.[9]

In subjects with a history of major depression, smoking may be an attempt to decrease negative affect. After an attempt to quit, such patients are likely to experience greater symptoms of nicotine withdrawal than smokers without a history of depression. Therefore, in patients who are attempting to quit smoking, inquiring about present or past symptoms of depression and anxiety is advisable, and specific therapy may be indicated.

Association with insomnia

Insomnia is an unrelenting problem affecting 10-35% of Americans.[10] As might be expected, the use of nicotine affects sleep. Nicotine reduces total sleep time, interferes with sleep initiation, and reliably fragments the sleep cycle.[11]

Association with posttraumatic stress disorder (PTSD)

The rates of smoking range from 40-86% among individuals with PTSD.[12] The co-occurrence of PTSD and nicotine use should be assessed among all current and former military service members. Roughly one third of current military service members smoke cigarettes.[13] The use of tobacco products increases with combat deployment, including the initiation of smokeless tobacco.[14] The strong relationship between smoking and combat-related PTSD may in part be explained by nicotine's role in reducing the trauma-induced emotional numbness.[15]

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Epidemiology

United States statistics

In 1965, 52% of men and 34% of women were cigarette smokers. In 2015, 15.1% of all adults (36.5 million people): 16.7% of males, 13.6% of females were current cigarette smokers.[16] This is down from nearly 21 of every 100 adults (20.9%) in 2005. Current cigarette smoking was highest among non-Hispanic American Indians/Alaska Natives and people of multiple races and lowest among Asians.[16]

From 2011 to 2016, current cigarette smoking declined among middle and high school students. About 2 of every 100 middle school students (2.2%) reported in 2016 that they smoked cigarettes in the past 30 days—a decrease from 4.3% in 2011; and 8 of every 100 high school students (8.0%) reported in 2016 that they smoked cigarettes in the past 30 days—a decrease from 15.8% in 2011. In 2016, about 7 of every 100 middle school students (7.2%) and about 20 of every 100 high school students (20.2%) used some type of tobacco product.[17, 18]

International statistics

Worldwide, approximately 1.1 billion people smoke. Also worldwide, tobacco use causes nearly 6 million deaths per year, and current trends show that tobacco use will cause more than 8 million deaths annually by 2030. In China, more than 70% of men older than 25 years smoke. Smoking is more prevalent in developing countries and is continuing to increase. The prevalence of smoking in North America is decreasing.

Age-related demographics

Studies reveal that the average age of first-time smokers is 14.5 years and the average age of daily smokers is 17.7 years. Approximately 20% of high school seniors smoke.

Early onset of tobacco use contributes to greater rates of addiction, making adolescence a particularly vulnerable age. Specific neurobiologic factors may contribute to adolescent vulnerability.[19] In a study by Bandiera et al, an association between the effects of secondhand smoke and various mental disorders in children and adolescents was reported.[20]

The 2012 US Surgeon General's report concluded that prevention efforts must focus on both adolescents and young adults because among adults who become daily smokers, nearly all first use of cigarettes occurs by age 18 years (88%), with 99% of first use occurring by age 26 years.[21]

The Surgeon General's report also states that tobacco use among adolescents and young adults has decreased substantially, especially since 1998. However, this decrease has begun to level off, particularly since 2007. Some groups have demonstrated increases in the prevalence of tobacco use (eg, the growth of smokeless tobacco use among white males). Some groups of young people continue to smoke more than others, notably American Indians and Alaska Natives but also whites and Hispanics.

With the introduction of new tobacco products and the promotion of smokeless tobacco products, use of multiple tobacco products is common. Among tobacco users, more than 50% of white and Hispanic high-school males and nearly 50% of Hispanic high-school females use more than one product.

According to the latest data from the U.S. Centers for Disease Control and Prevention and the U.S. Food and Drug Administration's Center for Tobacco Products, 3 million middle and high school students reported using e-cigarettes in 2015, compared with 2.46 million in 2014.[22]

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Prognosis

Mortality and morbidity

The detrimental health consequences of nicotine addiction are enormous. Tobacco smoking is responsible for 1 of every 5 deaths and is the most common cause of cancer-related deaths in the United States. Children smoke 1.1 billion packs of cigarettes yearly. This accounts for more than $300 billion in future health care costs.

Tobacco accounts for more than 85% of all deaths due to lung cancer. Since the Surgeon General's first report in 1964, approximately 10 million people in the United States have died from causes attributed to smoking; 2 million of these were from lung cancer alone. Furthermore, tobacco also has been identified as the leading cause of emphysema, COPD, bronchitis, and heart disease.

Laryngeal cancer is uncommon; however, in 1988, it accounted for 1.1% of cancer-related deaths in men and 0.3% of cancer-related deaths in women. Oral cancer accounted for approximately 2.1% of male cancer-related deaths and 1.2% of female cancer-related deaths in 1988. Cigarette smoking and tobacco chewing are major causes of this disease. Esophageal cancer accounted for 2.6% of male cancer-related deaths and 1% of female cancer-related deaths. Approximately 50% of overall esophageal cancer mortality is due to cigarette smoking.

Bladder cancer accounted for 2.4% of male cancer-related deaths and 1.3% of female cancer-related deaths in 1988; approximately one third of these deaths were related to cigarette smoking. Pancreatic cancer accounted for approximately 5% of cancer-related deaths in 1990; one third of these deaths were associated with cigarette smoking. Kidney cancer accounted for 2.3% of male cancer-related deaths and 1.8% of female cancer-related deaths.

Smoking has been established as an independent risk factor for uterine cervical cancer. Anal cancer in both heterosexual men and women also was due largely to cigarette smoking. Interactions between viral factors and tobacco exposure increase cancer risk.

Nonsmokers exposed to environmental tobacco smoke have a significantly higher risk of developing cancers and pulmonary diseases. Concentrations of toxins and carcinogens are higher in sidestream smoke. Children exposed to secondhand smoke develop a variety of respiratory disorders and morbidity.

Postcessation depression

An association between nicotine addiction and depression is well established. Previous studies also have demonstrated that dependent smokers have lower monoamine oxidase A and B activity than nonsmokers do. Smokers with a past history of major depression also were found to have significantly lower resting plasma norepinephrine levels. A history of depression also was found to be more frequent in female smokers.

Reports of severe major depressive episodes after smoking cessation indicate that the onset of severe depressive symptoms ranges from 2 days to 6 weeks after abstinence from smoking.

In some cases, depression after smoking cessation was resolved with the use of nicotine replacement therapy or the use of antidepressants; in others, depressive symptoms dissipated after a relapse to smoking. The significant predictors of major depressive episodes were as follows:

- Having a history of major depression
- Experiencing elevated withdrawal symptoms at the end of treatment

Obtaining information about any history of depressive symptoms is important, and when such a history is present, remaining alert to the possible onset of depression even weeks after smoking cessation treatment has ended is also important.

Antidepressants (eg, fluoxetine and sertraline) may be a useful cessation aid for smokers with prior major depression, and other authors have suggested that smokers with prior major depression benefit from mood management counseling and nortriptyline as cessation aids. Whether these treatments also prevent the onset of postcessation depression remains to be determined. It also remains to be seen whether effective management of withdrawal symptoms prevents postcessation depression.

Weight gain

Concerns about weight gain after smoking cessation are a well-known barrier to discontinuing tobacco use. In fact, many patients forego tobacco cessation fearing the subsequent weight gain. Such contentions often involve the comparative health risks of continued nicotine use versus weight gain. Current research offers little guidance concerning postcessation weight gain. Bupropion, nicotine replacement therapy (NRT), and varenicline appear to minimize weight gain only when prescribed, an effect that dissipates with the conclusion of pharmacologic treatment. Exercise can reduce weight over the long run.[23]

Smokers with weight concerns are more likely to relapse. Smoking for weight control reasons has been associated with being female, smoking more cigarettes per day, lower motivation to quit smoking, body image dissatisfaction, and higher Fagerstrom scores.[24]

Patient Education

All patients who smoke should receive education regarding the health effects of smoking. Patients should be provided with a variety of options and a range of advice that will allow them to escape the harmful effects of tobacco use and the addiction to nicotine.

Family education should be a primary recommendation every clinician undertakes in an effort to reduce teen smoking. Preliminary results from well-designed randomized controlled studies suggest that family interventions can reduce teen smoking.[25]

School-based smoking prevention programs educate students about tobacco use. Although such programs are widely seen in school curricula, the scientific evidence supporting their utility is limited.[26]

Both print and visual media are saturated with antismoking messages. A systematic review of the scientific literature shows that such messages have only a weak impact on smoking rates.[27]

Work-based smoking cessation programs that provide both behavioral treatment and medication support can be effective interventions with good quit rates.[28]

Naturally, many patients quit smoking on their own. (These probably would not be the typical patients seen in the office in the precontemplative or contemplative stage of change.) Such patients may be referred to various self-help materials (eg, books or pamphlets). The evidence that self-help materials lead to smoking cessation when used as the sole treatment strategy is weak.[29] Such materials are probably better used as tools to encourage personal education and to facilitate later dialogue between the clinician and the patient.

Patients interested in Web-based smoking cessation programs may find the following links helpful:

- “ Freedom from Smoking,” available from the American Lung Association
- The Tobacco Control Research Branch of the National Cancer Institute
- The Smoking Quitline of the National Cancer Institute (NCI), which makes smoking cessation counselors available to answer smoking-related questions in English or Spanish by telephone or confidential online chat
- The American Cancer Society website, which provides educational materials and can direct interested individuals to a community-based smoking cessation program called FreshStart
- Nicotine Anonymous ,a fellowship-based program structured along the same lines as Alcoholics Anonymous

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Presentation

History

Nicotine addiction is now referred to as tobacco use disorder in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5).[2]

There are 11 possible criteria, of which at least 2 must be present in the last 12 months:

1. Tobacco taken in larger amounts or over longer periods of time

2. Persistent desire or unsuccessful efforts to cut down or control use

3. A great deal of time is spent on activities necessary to obtain or use tobacco

4. Craving or a strong desire or urge to use tobacco

5. Recurrent tobacco use resulting in a failure to fulfill major role obligations at work, school, or home

6. Continued tobacco use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by effects of tobacco (eg, arguments with others about tobacco use)

7. Important social, occupational, or recreational activities are given up or reduced because of tobacco use

8. Recurrent tobacco use in situations in which it is physically hazardous (eg, smoking in bed)

9. Tobacco use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by tobacco

10. Tolerance, as defined by either the need for markedly increased amounts of tobacco to achieve the desired effect or a markedly diminished effect with continued use of the same amount of tobacco.

11. Withdrawal, as manifested by either the characteristic withdrawal syndrome or the use of tobacco to relieve or avoid withdrawal symptoms.

Symptoms of withdrawal include difficulty concentrating, nervousness, headaches, weight gain due to increased appetite, decreased heart rate, insomnia, irritability, and depression. These symptoms peak in the first few days but eventually disappear within a month.

Symptoms of nicotine toxicity, otherwise known as acute nicotine poisoning, include nausea, vomiting, salivation, pallor, abdominal pain, diarrhea, and cold sweat.

A previous history of depression, use of antidepressants in the past, and onset of depression during previous attempts to quit smoking should be obtained.

The time to first cigarette and total cigarettes per day are the 2 strongest predictors of nicotine addiction. The nicotine dependence and nicotine withdrawal could be treated by means of the following[4, 30] :

- Other forms of nicotine delivery
- Drugs that selectively target one or more of the underlying mechanisms
- Behavioral treatments, acupuncture, and other therapies

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Physical Examination

The physical effects of nicotine use include increased heart rate, accelerated blood pressure, and weight loss. The physical effects of nicotine withdrawal and smoking cessation include weight gain due to increase in appetite, decreased heart rate, and improvement in the senses of taste and smell.

In addition to its physical effects, nicotine exerts a strong behavioral influence. A complete mental status examination would begin with a general observation of the patient, which commonly a smoky smoke, tar-stained teeth, and premature skin aging.

Nicotine may enhance an individual’s level of alertness, although tobacco abuse and dependence may simulate a frantic, almost manic, picture. Speech may also be accelerated in line with behavior. Tobacco use can contribute to irritability, which is often soothed by a dose of nicotine. The early phases of withdrawal can present with more irritability, anxiety, and agitation. Although people ostensibly use tobacco for the pleasure derived from the nicotine, but anxiety and depression commonly coexist with tobacco use.

Tobacco use by itself is not considered a significant risk factor for suicide. However, concomitant disorders such as depression and anxiety do increase the risk of suicide. The clinician should inquire about the patient’s safety and probe further if the patient endorses suicidal ideation. The clinician should attempt to determine whether the suicidal ideation has matured to include a plan and, if so, what factors either aggravate or mitigate the patient’s propensity to convert ideation to an actual attempt.

As a general rule, nicotine does not produce perceptual or thought disorders, such as visual hallucinations or delusions. The use of nicotine should not negatively impact memory, the ability to perform simple calculations, abstract thinking, or judgment. Tobacco use disorders should not cause delirium or dementia.

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Diagnostic Considerations

In addition to the conditions listed in the differential diagnosis, other problems to be considered include the following:

- Fetal growth retardation
- Atherosclerotic vascular disease
- Cancer
- Histiocytosis X
- Respiratory bronchitis
- Obstructive sleep apnea
- Idiopathic pneumothorax
- Low birth weight
- Perinatal mortality

Differential Diagnoses

- Alpha1-Antitrypsin (AAT) Deficiency
- Angina Pectoris
- Chronic Obstructive Pulmonary Disease (COPD)
- Depression
- Emphysema
- Non-Small Cell Lung Cancer (NSCLC)
- Small Cell Lung Cancer (SCLC)

Treatment

Approach Considerations

Tobacco use is the greatest potentially remedial problem throughout the world, and it is the number one preventable cause of death in the developed world. Clinicians have a particularly important role as patient advocates in health promotion, discouraging smoking initiation, encouraging and assisting smoking patients to quit, and participating in social efforts designed to curb smoking at various levels.

The gains in understanding the neuropathology of nicotine addiction have already opened new frontiers, including effective nicotine replacement therapy (NRT) and oral therapy. Greater therapeutic advances are anticipated in the years to come.

A critical component of treatment is educating patients about the benefits of smoking cessation and the cessation process. Provide a description of the expected withdrawal syndrome. Continue with a discussion of the possible cessation methods, which include counseling, NRT, antidepressant medications, behavioral training, group therapy, hypnosis, and quitting “cold turkey.” Successful cessation is confirmed by measuring cotinine or carbon monoxide levels.

More than 90% of patients who attempt to quit smoking stop cold turkey. Professional group therapy or counseling achieves an initial cessation rate of 60-100% and a 1-year cessation rate of approximately 20%. Hypnosis and acupuncture are popular programs that might encourage renewed attempts by people for whom other techniques have failed, but these modalities have not been shown to be any better than placebo.

The use of smokeless tobacco products constitutes a small but growing segment that requires special considerations in the design of treatment interventions.[31] NRT does not increase smokeless tobacco quit rates; however, of the pharmacologic options, varenicline shows early positive results.

Patients who quit smoking tend to gain weight; therefore, patients should be encouraged to follow a low-calorie diet and exercise regimen during and after cessation. In patients attempting smoking cessation, exercise has been shown to help curb long-term weight gain and to help alleviate nicotine withdrawal symptoms.

Interventions designed specifically for weight-concerned smokers (eg, an on-site exercise program) improved smoking abstinence rates and delayed weight gain. Cognitive-behavioral therapy to reduce weight concerns improved smoking cessation success and reduced weight gain.

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Counseling

Smoking may begin as a voluntary habit, but eventually it becomes an addiction. Health professionals can contribute powerfully to motivating their patients to attempt and sustain cessation by offering encouragement, advice, and assistance.

When patients are not yet ready to attempt quitting, such advice can move them further toward that point. Willingness to help and availability to provide assistance are very important in motivating cigarette smokers in attempting to quit. Reassurance that a knowledgeable health professional stands ready to offer guidance and support is immensely beneficial to individuals addicted to nicotine.

According to US Preventive Services Task Force (USPSTF) guidelines, clinicians should ask all adults about use of tobacco products and should provide cessation interventions to all current tobacco users. The guidelines advocate a “5-A” approach to counseling that includes the following[32] :

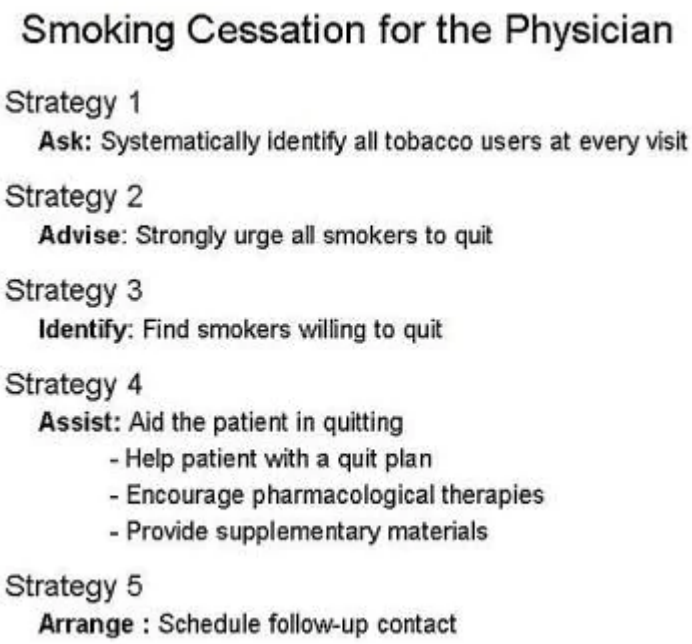
1. A sk about tobacco use
2. A dvise to quit through personalized messages
3. A ssess willingness to quit
4. A ssist with quitting
5. A rrange follow-up care and support

Brief behavioral counseling (ie, < 10 minutes) and pharmacotherapy are each effective when used alone, though they are most effective when used together.[33]

The task force also advises clinicians to ask all pregnant women, regardless of age, about tobacco use. Those who currently smoke should receive pregnancy-tailored counseling supplemented with self-help materials.

Understanding the benefits and limitations of the available medications provides an important foundation for a successful smoking cessation program.

Assess smoking history, level of addiction, and the health status of the patient (see the image below). After the assessment, intervene with education and advice. Patients may be referred for group therapy or behavioral counseling. If an affective disorder is suspected, evaluation by a psychiatrist may be indicated.



Smoking cessation strategies for clinicians.
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Nicotine Replacement Therapy

NRT works by making it easier to abstain from tobacco by partially replacing the nicotine previously obtained from tobacco.[3] There are at least 3 mechanisms by which NRT could be effective, as follows:

1. Reducing general withdrawal symptoms, thus allowing people to learn to get by without cigarettes
2. Reducing the reinforcing effects of tobacco-delivered nicotine
3. Exerting some psychological effects on mood and attention states

Nicotine replacement medications should not be viewed as standalone medications that make people stop smoking; reassurance and guidance from health professionals are still critical for helping patients achieve and sustain abstinence. There are 6 types of nicotine replacement products currently on the market, as follows:

1. Transdermal nicotine patch
2. Nicotine nasal spray
3. Nicotine gum
4. Nicotine lozenge
5. Sublingual nicotine tablet
6. Nicotine inhaler

The first type is intended for longer-term use, whereas the other 5 types are used for acute dosing. With the acute-dosing products, the amount and timing of nicotine delivery can be titrated by the user, allowing the use of these products as rescue medication for cravings.

Ongoing craving in a quitter is associated with acute episodes of more intense craving (ie, breakthrough craving). Provoked by situational stimuli, such as seeing someone smoke or experiencing emotional upset, such episodes are associated with a very high risk of relapse. Acute NRT approaches may also be used when a situation is expected to produce a craving (eg, a demanding meeting, rush-hour traffic, a long commute, or a social situation where cigarette smokers will be present).

Common adverse events that are common to all NRT products include dizziness, nausea, and headache.

Transdermal nicotine patch

Nicotine patches deliver nicotine through the skin at a relatively steady rate.[34] In general, they yield higher compliance rates than other NRT products do, but they may not adequately protect against craving provoked by smoking-related stimuli. For breakthrough cravings not adequately controlled by transdermal nicotine alone, acute therapies (see below) may be added.

Currently, 4 patch formulations are on the market; they vary widely with regard to design, pharmacokinetics, and duration of wear (eg, 16 or 24 hours). For some products, progressively lower doses may be given to allow weaning over a period of several weeks or longer so that the patient can gradually adjust to lower nicotine levels and ultimately to a nicotine-free state. Those who smoke more than 10 cigarettes per day should use the 21-mg/day patch for the first 6 weeks, the 14-mg/day patch for 2 weeks, and the 7-mg/day patch for the final 2 weeks.

Relapse is common and expected in the early stages of tobacco cessation treatment. A randomized, double-blind, placebo-controlled trial showed that active use of the nicotine patch (21 mg/day) by subjects who experienced a relapse during treatment significantly increased the likelihood of recovery from the relapse in comparison with those who received placebo.[35] Clinicians could encourage continued use of the nicotine patch during these relapses.

In a study testing the efficacy of nicotine patches in combination with behavioral therapy for the treatment of adolescent spit tobacco addiction, the spit tobacco cessation rate was 11.4% in the usual care group, 25% in the placebo patch group, and 17.3% in the active patch group.[36] The difference between the cessation rates for the last 2 groups was not significant, proving that behavioral intervention is twice as successful and that the nicotine patch did not offer additional improvement.

Nicotine nasal spray

Marketed as a prescription medication, the nasal spray delivers nicotine more rapidly than other NRTs and affords relief of acute cravings. The multidose bottle with a pump delivers 0.5 mg of nicotine per 50-µL squirt. Each dose consists of 2 squirts, 1 to each nostril. The dosage of nasal spray should be individualized for each patient according to the patient's level of nicotine dependence. Most patients are started with 1 or 2 doses per hour, which may be increased up to the maximum of 40 doses per day.

Nicotine gum

First available in the 1980s, nicotine polacrilex (nicotine gum) is available without a prescription.[37] It is available in 2-mg and 4-mg doses, which deliver approximately 1 mg and 2 mg of nicotine, respectively.

Patients are instructed to use 1 piece of gum every 1-2 hours for the first 6 weeks and then reduce their use to 1 piece every 2-4 hours for the next 3 weeks and finally to 1 piece every 4-8 hours for the 3 weeks after that. In highly dependent smokers, the 4-mg gum is superior to the 2-mg gum. Because about 50% of the nicotine in gum is absorbed, a smoker who is on a fixed schedule of 10 pieces per day will receive a daily nicotine dose of about 10 mg with the 2-mg gum and 20 mg with the 4-mg gum.

Slow absorption of nicotine from gum doses will not produce extremely high levels of nicotine. Acidic beverages interfere with buccal absorption of nicotine; thus, patients should avoid acidic beverages (eg, soda, coffee, and beer) for 15 minutes before and during chewing gum. Nicotine gum chewing may cause jaw soreness; therefore, the smoker should chew the gum to release nicotine, then move the gum between the cheek and gum for a minute or so. Gum can also cause a mild burning sensation in the mouth and throat, which may be undesirable.

An open randomized trial of 314 daily smokers found that starting nicotine gum 4 weeks before the quit date did not yield higher smoking cessation rates than starting on the quit date.[38] At follow-up 8 weeks after the quit date, self-reported 4-week abstinence rates were 41.6% for the pre–quit date group and 44.4% for the usual care group. Biochemically verified cessation occurred at 1 year after the quit date for participants, and no significant difference was found between the 2 groups (20.8% for the first group, 19.4% for the second).[39]

Nicotine lozenge

The nicotine lozenge has been available in 2- and 4-mg formulations since 2002. Nicotine from the lozenge is absorbed slowly through the buccal mucosa. The lozenge should not be chewed, and the amount of nicotine absorbed per lozenge is somewhat higher than that absorbed from nicotine gum.

Sublingual nicotine tablet

A small nicotine tablet has been developed but is not yet available in the United States. The product is designed to be held under the tongue, where the nicotine in the tablet is absorbed sublingually. The levels of nicotine obtained by using the 2-mg tablet are comparable to those obtained by using the 2-mg nicotine gum. It is recommended that smokers use the sublingual tablet for at least 12 weeks, after which period the number of tablets used is gradually tapered.

Nicotine inhaler

Currently marketed as a prescription medication in the United States, the nicotine inhaler consists of a mouthpiece and a plastic cartridge containing nicotine. When the inhaler is “puffed,” nicotine is drawn into the mouth of the smoker; this satisfies a key behavioral aspect of smoking—namely, the hand-to-mouth ritual.

Each inhaler cartridge contains 10 mg of nicotine, of which 4 mg can be delivered; of the 4 mg delivered, 2 mg is absorbed. The nicotine is not delivered to the bronchi or lungs but is deposited and absorbed in the mouth, as with nicotine gum. Most people use between 6 and 16 cartridges a day. The recommended duration of treatment is 3 months, after which period patients may be weaned by gradual reduction over the following 6-12 weeks.

Efficacy of NRT

In a Cochrane meta-analysis of 132 trials involving the use of any type of NRT along with a placebo or non-NRT control group, the risk ratio (RR) of abstinence for any form of NRT relative to control was 1.58 (95% confidence interval [CI], 1.50-1.66).[3] The pooled RRs for each type were as follows:

- 1.43 (95% CI, 1.33 to 1.53; 53 trials) for nicotine gum
- 1.66 (95% CI, 1.53-1.81; 41 trials) for the transdermal nicotine patch
- 1.90 (95% CI, 1.36-2.67; 4 trials) for the nicotine inhaler
- 2.00 (95% CI, 1.63-2.45; 6 trials) for oral tablets or lozenges
- 2.02 (95% CI, 1.49-3.73, 4 trials) for the nicotine nasal spray

Thus, all of the commercially available forms of NRT increase the chances of successful smoking cessation. Overall, NRT increases the quit rate by 50-70%, and the increase appears to be independent of any additional support provided.

Piper et al conducted a randomized, placebo-controlled, double-blind trial of 5 smoking cessation pharmacotherapies.[40] The study population included 1504 adults who smoked at least 10 cigarettes daily for the previous 6 months and were motivated to quit smoking. Patients were randomly assigned to 1 of the following groups: nicotine lozenge, nicotine patch, sustained-release bupropion, nicotine patch plus nicotine lozenge, bupropion plus nicotine lozenge, or placebo.

All treatment groups had smoking cessation rates differing from those of the placebo group, but only the nicotine patch–plus–nicotine lozenge group showed significantly higher abstinence rates at 6 months after quitting in comparison with the placebo group.[40] The effects of the nicotine lozenge, bupropion, and bupropion plus lozenge were comparable with those reported in previous research.

A Canadian study, purported to be the first population-based longitudinal study using a representative sample of smokers, examined the association between duration of NRT use and smoking cessation (≥1 month). Results of the study support the recommendation to use NRT, particularly the patch, for 8–12 weeks in the clinical practice guideline by the US Public Health Service.[41, 4]

Long-term NRT

Smoking cessation treatments with NRT enable smokers to cease tobacco use and subsequently to withdraw from nicotine altogether. However, for some smokers, complete withdrawal from smoking may be difficult. In those individuals, it may be beneficial to continue NRT for longer periods, even indefinitely, to prevent relapse to smoking. This strategy is essentially the same as that currently used in methadone maintenance programs for heroin-dependent patients, where patients may be maintained on daily doses of methadone for years.

Although nicotine is not entirely without risk, nicotine maintenance is clearly safer than cigarette smoke–delivered nicotine, with its numerous accompanying toxins. Therefore, indefinite NRT to prevent resumption of smoking may be considered for some individuals.

Non-Nicotine Pharmacotherapy

Bupropion

Bupropion acts by alleviating some of the symptoms of nicotine withdrawal, which include depression.[42, 43] One clinical trial demonstrated that highly nicotine-dependent smokers who receive bupropion are more likely to experience a decrease in depressive symptoms during active treatment. Like NRT products, bupropion has been endorsed by the US Clinical Practice Guideline as a first-line therapy.[4]

Compared with placebo, bupropion approximately doubles smoking cessation rates, and it is equally effective for men and women. It may yield higher cessation rates when combined with NRT than when used alone. However, Planer et al found that bupropion was not effective in hospitalized patients with acute coronary syndrome (patients who are at high risk for subsequent ischemic events) despite continuous and intensive nurse counseling about smoking cessation.[44]

The recommended and maximum dosage of bupropion is 300 mg/day, given as 150 mg twice daily. Dry mouth and insomnia are the most common adverse events associated with use. A very small risk of seizure exists, which can be reduced by not prescribing the medication to persons with a history of seizure or a predisposition toward seizure.

Varenicline

Varenicline is a partial agonist that is selective for alpha-4, beta-2 nicotinic acetylcholine receptors (nAChRs). Its action is thought to result from activity at a nicotinic receptor subtype, where its binding produces agonist activity while simultaneously preventing nicotine binding. Its agonistic activity is significantly lower than that of nicotine. Varenicline helps smokers quit by preventing withdrawal symptoms while moderate levels of dopamine are maintained in the brain.

In a Cochrane meta-analysis including 5 trials of varenicline versus placebo (of which 3 also included bupropion as a comparator), the pooled odds ratio (OR) for continuous abstinence was 3.22 (95% CI, 2.43-4.27) for varenicline versus placebo at 12 months and 1.66 (95% CI, 1.28-2.16) for varenicline versus bupropion.[45] The main adverse effect of varenicline was nausea, which was mostly mild to moderate and usually subsided over time. Varenicline yielded a 3-fold increase in long-term smoking cessation rates compared with unassisted quit attempts.

In another Cochrane study, 11 randomized, controlled trials (with over 10,000 subjects) involving the use of nicotine receptor partial agonists for smoking cessation were reviewed,[45] and the pooled RR (for 10 trials with 4443 subjects; 1 trial that evaluated long-term safety was excluded) for continuous abstinence at 6 months or longer was 2.31 for standard-dosage varenicline versus placebo (95% CI, 2.01 to 2.66).

The main side effect remains nausea, which tends to diminish over time. Soon after the introduction of varenicline, scattered reports of an association between the medication’s use and depression and suicidal ideation arose. The results of the aforementioned review of 11 published studies suggest that any such association is likely to be weak[45] ; nevertheless, the possibility warrants further monitoring.

A systematic review and meta-analysis of 14 double-blind, randomized, controlled trials comprising more than 8000 tobacco users (including smokeless tobacco) who used varenicline found a 72% increased risk of serious adverse cardiovascular events in the varenicline group compared with the placebo group (1.06% vs 0.82%).[46]

In this review, serious adverse cardiovascular events were defined as myocardial infarction, unstable angina, coronary revascularization, coronary artery disease, arrhythmias, transient ischemic attacks, stroke, sudden death or cardiovascular-related death, or congestive heart failure.[46]

A meta-analysis reported by the FDA in 2012 also showed an increased risk of serious adverse cardiovascular events in patients receiving varenicline compared to those receiving placebo. Although the events were uncommon in both groups and the risk was not statistically significant, data analysis points to the drug as the likely cause.[47]

On the basis of study findings, extreme caution should be used when considering varenicline for patients with known cardiovascular problems.

Besides NRT products and bupropion, nortriptyline and clonidine are endorsed by the US Clinical Practice Guideline as second-line therapies.

Nortriptyline

Studies have demonstrated the potential efficacy of nortriptyline for smoking cessation in smokers without history of major depression.[42] Nortriptyline in combination with transdermal nicotine was also shown to enhance the cessation rates above levels seen with transdermal nicotine alone. The tricyclic antidepressant doxepin has also been shown in a small human study to improve cessation rates.

The most commonly encountered side effects associated with nortriptyline include fast heart rate, blurred vision, urinary retention, dry mouth, constipation, weight gain or loss, and low blood pressure on standing.

Nortriptyline is endorsed by the US Clinical Practice Guideline as a second-line therapy.

Clonidine

Clonidine, an alpha2 -noradrenergic agonist used to treat hypertension, has been shown to diminish symptoms of both opiate and alcohol withdrawal symptoms. A study of heavy smokers who had failed in previous quit attempts found that those treated

with clonidine had an abstinence rate double that seen in smokers treated with placebo at the end of the 4-week treatment period; this effect persisted for the 6-month follow-up period.

Although clonidine may be efficacious in the treatment of nicotine addiction, the conditions under which it is most appropriately used are not well defined. The most common side effects of clonidine are constipation, dizziness, drowsiness, dryness of mouth, and unusual tiredness or weakness.

Like nortriptyline, clonidine is endorsed by the US Clinical Practice Guideline as a second-line therapy.

Combination Pharmacotherapy

To improve smoking cessation, medications can be combined. For example, passive nicotine delivery (eg, via a transdermal patch) may be used in conjunction with another medication that permits acute dosing (eg, gum, nasal spray, or inhaler). Combining the nicotine patch (which may prevent the appearance of severe withdrawal) with acute-dosing formulations (which can provide relief in trigger-to-smoke contexts) may provide an excellent treatment alternative to the use of either therapy alone.[48, 49]

Bupropion in combination with a nicotine patch appears to be more efficacious than a nicotine patch alone, possibly because the 2 medications act via different pharmacologic mechanisms.[50] Despite the possibility of increased efficacy, the US Clinical Practice Guideline recommends that such combination therapy be prescribed under the direction of an experienced clinician or a specialty clinic.

Novel therapies

In view of the rather limited success achieved with most pharmacologic and behavioral therapies is rather limited, there is clearly a need for other and better treatments. One novel approach is to immunize smokers against nicotine. The rationale is that antibodies induced by the vaccine should bind nicotine in the blood, thereby preventing it from reaching the nicotine receptors in the brain and breaking the cycle of nicotine addiction.

A prototype vaccine against nicotine was developed and studied in a randomized trial in which 229 subjects received 5 intramuscular injections of the nicotine vaccine and 112 placebo; the vaccine was safe and generally well tolerated, despite failure to increase continuous abstinence rates significantly, and results were significant in subgroup analyses.[51] Although more studies are needed, immunotherapy appears to have opened a new avenue to the treatment of nicotine addiction.

In a preliminary assessment of the first phase III trial, the nicotine vaccine NicVAX (Nabi Biopharmaceuticals, Rockville, MD) failed to meet the primary endpoint of abstinence from smoking at 12 months.[52] Results showed that subjects treated with NicVAX quit smoking at roughly the same rate (about 11%) as subjects who received placebo. A second phase III trial is under way.

Mecamylamine is a nicotine antagonist that—at least in principle—would seem capable of playing a role in smoking cessation. Much as opiate antagonists prevent opiate users from achieving a high, mecamylamine would prevent smokers from deriving any pleasurable affects from nicotine. The combination of mecamylamine with the nicotine patch increased successful quit rates. Routine clinical use of mecamylamine must await further research.[53]

Prevention

More than 90% of first-time use of tobacco occurs before high school graduation. Because the average age at first use is 14.5 years, smoking prevention must start early. Because of their developmental stage, adolescents are more susceptible to social and environmental influences to use tobacco.[21] Approximately 40% of teenagers who smoke eventually become addicted to nicotine.

Social attitudes and policies toward smoking can have a major impact on smoking behavior. Healthcare associations, public health organizations, and consumer groups should lobby for the following:

- Restriction of access to tobacco products for minors
- Restriction of smoking in public places
- Restriction of advertisements
- Increased prices through taxation

- Increased awareness of the harmful health effects of smoking

Minimizing nicotine use among adolescents is an important social policy that can reduce adult addiction. Unfortunately, at the present time, no single clinical approach emerges as the best pathway. Clinical strategies that incorporate motivational interventions and cognitive-behavioral treatments show promise but await further research confirmation.[54]
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Long-Term Monitoring

Highly nicotine-dependent smokers may require initial therapy for 6 months or longer. Some individuals may require low-dose maintenance therapy for years.

Long-term follow-up is recommended because individuals who successfully quit smoking are at high risk for relapse. Relapse during the first year after achieving smoking cessation occurs in approximately 50% of patients, irrespective of therapeutic regimen. The changes in the central nervous system (eg, in neuron genetics, cell structure, and cell function) induced by smoking are not reversed by pharmacologic therapy.

The health care deliverer should make provisions for support, measurement of progress, and a mechanism to deal with relapse. For motivated patients who have failed smoking cessation, referral to an expert should be considered for treatment of a relapse. Controlled studies are required to help guide management of relapses and prolonged tapering periods. Immediately restarting nicotine medication might be helpful if a relapse occurs.

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Medication

Medication Summary

Two types of pharmacologic therapy are available as part of a smoking cessation program nicotine and antidepressants. The goals of pharmacotherapy are to induce smoking cessation, reduce morbidity, and prevent complications.

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Smoking Cessation Aids

Class Summary

Nicotine replacement therapy (NRT) is available in the form of cutaneous patches, inhaled or nasal delivery, or chewing gum. Nicotine patches are sold under various trade names (see below). For each proprietary system, the dosing schedule involves a graduated decrease of the drug dose over 9-12 weeks.

Nicotine acetylcholine receptor partial agonists are also used as smoking cessation aids. They bind to nicotine receptors and elicit mild central effects to ease nicotine withdrawal symptoms. They also decrease the stimulatory effect of nicotine consumption by blocking nicotine receptors.

Nicotine transdermal system (NicoDerm CQ, Nicorette, Thrive, Nicotrol Inhaler, Nicotrol NS, Nicorelief)

Nicotine stimulates all autonomic ganglia and catecholamine discharge in the adrenal medulla at small doses. At larger doses transmission through autonomic ganglia is blocked and catecholamine discharge from the medulla is inhibited.

Nicotine replacement therapy works best when used in conjunction with a support program, such as counseling, group therapy, or behavioral therapy.

Nicotine chewing gum, if chewed correctly, increases quit rates up to 2-fold. At 1 year, the abstinence rate with the patch is 20%. At 4 years, the abstinence rate is 12.4%, as opposed to 4.5% with placebo. Nicotine patches are sold under various trade names (see below). For each proprietary system, the dosing schedule involves a graduated decrease of the drug dose over 9-12 weeks.

Nicotine gum is marketed in 2 strengths, 2 mg and 4 mg. Individuals who smoke 1 pack per day should use the 4-mg pieces; those who smoke less than 1 pack per day should use the 2-mg pieces. Instruct the patient to chew hourly and for their initial cravings for 2 weeks, then gradually reduce the amount chewed over the next 3 months.

The nicotine nasal spray and the inhaler dosage forms provide nicotine delivery through the nasal and oral mucosa, respectively.

The nicotine in nicotine polacrilex is absorbed through the oral mucosa. Absorption is quick and closely approximates the time course of plasma nicotine levels observed after cigarette smoking.

Intranasal nicotine and nicotine from an oral inhaler may closely approximate the time course of plasma nicotine levels observed after cigarette smoking.

Varenicline (Chantix)

Varenicline is a partial agonist that is selective for alpha-4, beta-2 nicotinic acetylcholine receptors. Its action is thought to result from activity at a nicotinic receptor subtype, where its binding produces agonist activity while simultaneously preventing nicotine binding. Its agonistic activity is significantly lower than that of nicotine. It also elicits moderate affinity for serotonin receptors. Maximum plasma concentrations occur within 3-4 hours after oral administration. With regular dosing, a steady state is reached within 4 days.

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Antidepressants, Other

Class Summary

These medications ameliorate withdrawal symptoms while the smoker deals with behavioral aspects of smoking cessation.

Bupropion is used as a non–nicotine-containing aid to smoking cessation. It acts by enhancing central nervous nonadrenergic function. A 23% sustained cessation rate is achieved with bupropion tablets at 1 year, compared with a 12% sustained cessation rate with placebo. Bupropion also is effective for patients in whom nicotine replacement therapy fails.

Bupropion hydrochloride (Zyban, Aplenzin, Fortivo XL, Wellbutrin XL)

Bupropion is used in conjunction with a support group, behavioral counseling, or both. It may also be used in combination with nicotine replacement therapy. It inhibits neuronal dopamine reuptake, in addition to being a weak blocker of serotonin and norepinephrine reuptake. For any given dosage form use the same total daily dose but adjust frequency as indicated for immediate (3-4 times daily), sustained release (twice daily), or extended release (once daily).

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Questions & Answers

Overview

What is nicotine addiction?

What are the signs and symptoms of nicotine addiction?

What are the DSM-5 diagnostic criteria for nicotine addiction (tobacco use disorder)?

What is the role of nicotine replacement therapy in the treatment of nicotine addiction?

What are the types of nicotine replacement therapy used in the treatment of nicotine addiction?

What is the role of non-nicotine drug treatment for nicotine addiction?

What is nicotine addiction?

What are the AHA-ASA recommendations regarding nicotine addiction?

What is a case study about nicotine addiction?

What is the pathophysiology of nicotine addiction?

What is the association between nicotine addiction and depression?

What is the association between nicotine addiction and insomnia?

What is the association between nicotine addiction and posttraumatic stress disorder (PTSD)?

What is the prevalence of nicotine addiction in the US?

What is the global prevalence of nicotine addiction?

Which age groups have the highest prevalence of nicotine addiction?

What is the mortality and morbidity associated with nicotine addiction?

What is the association of nicotine addiction and postcessation depression?

What is the association between nicotine addiction and weight?

What is included in patient education about nicotine addiction?

What online smoking cessation programs for nicotine addiction are available?

Presentation

What are the DSM-5 diagnostic criteria for nicotine addiction (tobacco use disorder)?

What are the signs and symptoms of withdrawal and nicotine toxicity?

How are nicotine dependence and withdrawal treated?

Which physical findings are characteristic of nicotine addiction?

DDX

Which conditions should be included in the differential diagnoses of nicotine addiction?

What are the differential diagnoses for Nicotine Addiction?

Treatment

How is nicotine addiction treated?

What is the role of counseling in the treatment of nicotine addiction?

What are the USPSTF treatment guidelines for nicotine addiction?

What are mechanisms of action for nicotine replacement therapy (NRT) to treat nicotine addiction?

What are the types of nicotine replacement products used for the treatment of nicotine addiction?

What are the possible adverse effects of nicotine replacement therapy (NRT) for nicotine addiction?

What is the role of the transdermal nicotine patch in the treatment of nicotine addiction?

What is the role of nicotine nasal spray in the treatment of nicotine addiction?

What is the role of nicotine gum in the treatment of nicotine addiction?

What is the role of nicotine lozenge in the treatment of nicotine addiction?

What is the role of sublingual nicotine tablet in the treatment of nicotine addiction?

What is the role of nicotine inhaler in the treatment of nicotine addiction?

What is the efficacy of nicotine replacement therapy (NRT) for the treatment of nicotine addiction?

Medications

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