CONTINUING MEDICAL EDUCATION

Treatment of Tobacco Dependence

Anil Batra

SUMMARY

Background: 110 000 to 140 000 people die in Germany each year of tobacco-related diseases. Thus, measures should be taken to lower the number of persons who start smoking, encourage smokers to stop, and keep those who have stopped from starting again, in order to achieve a sustained benefit in public health.

Method: We present recommendations for the diagnostic evaluation, counseling, psychotherapy, and pharmacotherapy of smokers, derived from the findings of current Cochrane meta-analyses and from the pertinent German-language and American guidelines.

Results: Motivational interviewing by a physician, including a recommendation to stop smoking and counseling on how to do this, can reinforce a smoker's motivation to quit. Behavioral therapeutic approaches support changes in behavior, while medical aids such as nicotine replacement therapy, bupropion, and varenicline help former smokers overcome the initial withdrawal symptoms. Low-threshold measures such as self-help books, telephone counseling, and Internet-based cessation programs complement the evidence-based treatments. With a combination of medications and psychotherapeutic support, abstinence rates of up to approximately 40% can be achieved at the end of one year.

Conclusion: Smokers who decide to quit can benefit from their doctors' support. Physicians should be taught about tobacco dependency and how to treat it as part of their undergraduate medical education, residency training, and continuing medical education.

► **Cite this as:**

Batra A: Treatment of tobacco dependence.
Dtsch Arztebl Int 2011; 108(33): 555–64.
DOI: 10.3238/arztebl.2011.0555

With the design of highly synthetic cigarettes and through a sustained effort by the tobacco industry to market their products since the end of the last century, the popularity of smoking reached its peak. The special fascination of smoking for adolescents lies in an association with certain socially valued traits (freedom, autonomy, strength) that is reinforced by cigarette advertising. Over time, tobacco consumption takes on social and psychological functions for the smoker. For many smokers, smoking can ease communication, justify a break from work, serve as a reward, curb the appetite, ward off fatigue, or suppress negative feelings (stress, boredom, nervousness, anxiety, depression). The neurobiological effect of nicotine is perceived as rewarding, stimulating, appetite-reducing, vigilance-promoting, or calming. Its multifarious psychotropic effects are traceable to the nicotine-mediated release of dopamine, noradrenaline, serotonin, and beta-endorphin. Physical dependence arises in regular smokers through an adaptation of the dopaminergic system and an increase in the number of nicotinic $\alpha 4\beta 2$ -acetylcholine receptors. A dependent smoker who stops consuming nicotine experiences withdrawal symptoms (e1).

Learning objectives

The learning objectives for readers of this article are:

- to become acquainted with the techniques of motivational interviewing that will strengthen the patient's motivation to quit smoking;
- to gain an overview of the available types of supportive pharmacotherapy;
- to learn about the many available low-threshold aids to smoking cessation.

Tobacco consumption is the single most important preventable risk to health. Smokers lose, on average, about ten years of life. In a long-term prospective study of 35 000 people, 81% of the nonsmokers, but only 58% of the smokers, reached age 70; 59% of the

Smoking

Smoking is one of the most important preventable risk to health.

Mortality as a function of smoking status among British physicians (from [1])

non-smokers, but only 26% of the smokers, reached age 80 (*Figure*) (1). In Germany alone, smoking contributes to the premature death of 110 000 to 140 000 people each year (2). An estimated 11% of overall mortality is due to smoking, and 6% to the combined effects of alcohol consumption and smoking.

The main tobacco-associated diseases are cancers of the respiratory tract, cardiovascular diseases, and chronic obstructive pulmonary disease (COPD). Moreover, other types of cancer are also more common in smokers. Persons with mental illnesses such as anxiety disorders, depression, schizophrenia, eating disorders, and alcohol and drug dependence are much more likely to be smokers than the general population (3).

In recent decades, the combined effect of primary prevention, the rising cost of cigarettes, advertising bans, and laws to protect nonsmokers has been to lower the prevalence of smoking, particularly among children and adolescents aged 12 to 17. In 2010, 14.2% of boys and 11.5% of girls aged 12 to 17 were smokers; these figures are the lowest since 1979 (4). The German Federal Statistical Office has documented a nearly constant prevalence of smoking among adults since 1999; in 2009, about 26% of the overall population aged 15 and above were smokers (5). Clearly, more effective measures need to be taken to improve primary prevention among the general public. Health-care providers need to be more aware of the dangers of smoking, promote tobacco abstinence more vigorously, and offer treatment more often to their patients who need it.

The following information and recommendations

regarding the diagnostic evaluation of smokers as well as motivational interviewing, psychotherapy, and pharmacotherapy for smoking cessation are derived from the current German and American treatment guidelines and from Cochrane meta-analyses. The current version of the American guidelines (2008) contains valuable reference information on the scientific evidence for the efficacy of various treatments for tobacco dependence (6). The Drug Commission of the German Medical Association recently updated its treatment recommendations for tobacco dependence (7). In 2008, the German Society for Pulmonology and Respiratory Medicine (*Deutsche Gesellschaft für Pneumologie und Beatmungsmedizin*, DGP) issued an S3 guideline on smoking cessation in patients with COPD (8, 9). The German Association for Psychiatry and Psychotherapy (*Deutsche Gesellschaft für Psychiatrie, Psychotherapie und Nervenheilkunde*, DGPPN) and the German Association for the Study and Treatment of Addiction (*Deutsche Gesellschaft für Suchtforschung und Suchttherapie*, DG-Sucht) are currently revising their guidelines on smoking cessation (10), which are issued under the auspices of the Association of Scientific Medical Societies in Germany (*Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften*, AWMF).

Diagnostic evaluation

Important information for the physician guiding a patient through outpatient smoking cessation includes: the extent and duration of tobacco consumption, the number of prior attempts to quit smoking, the presence or absence of tobacco dependence, any prior treatments for smoking cessation, and—if medications are to be given to help the patient quit smoking—any current illnesses and medications.

The ICD-10 contains two relevant diagnoses, tobacco abuse (F17.1) and tobacco dependence (F17.2). The latter requires the presence in the past year of at least 3 of the 6 criteria listed in *Box 1* (10). A number of authors have estimated that 50% to 60% of smokers are tobacco-dependent by this definition (11).

Beyond this categorization of tobacco smoking into two conditions (abuse and dependence), there are questionnaires and self-assessment instruments that enable a dimensional assessment of the severity of dependence. A popular one is the Fagerström Test for Nicotine Dependence (FTND, 12), in which six questions are used to assess the severity of dependence on

The main tobacco-associated diseases

- Cancers of the respiratory tract
- Cardiovascular diseases
- Chronic obstructive pulmonary disease

History

The smoking history should include the extent and duration of smoking and the Fagerström test for nicotine dependence.

an overall scale from 0 to 10 (*Box 2*). High scores reflect the appearance of physical withdrawal phenomena and a lower probability of long-term abstinence. Smokers can self-administer this test in two minutes; it is recommended for use in diagnostic assessment as well as in motivational support and differential treatment planning. Other, less commonly used questionnaires that address the urge to smoke (Questionnaire on Smoking Urges, QSU [13]) or smoking behavior in adolescents (Hooked on Nicotine Checklist, HONC [14]) play no more than a minor role in routine care.

Pack-years (the product of the patient's daily cigarette consumption, in packs per day, and the duration of smoking, in years) are an important indicator of the tobacco-associated risk to health. The carbon monoxide concentration in exhaled air is both a good indicator of the toxic load and a useful means of checking the patient's compliance with a smoking cessation program. A suitable apparatus is used to measure the fraction of exhaled air consisting of CO molecules, in parts per million (ppm), after the patient takes a deep breath, holds his or her breath for 15 seconds, and then exhales (smokers usually have values from 10 to 40 ppm; a value of 8 ppm is consistent with tobacco abstinence). Moreover, for many smokers, a demonstrated reduction of the CO load serves as a positive motivating factor for persisting in the effort to quit. Alternatively, the intensity of tobacco consumption can be assessed by measuring the carboxyhemoglobin (CO-Hb) concentration in the blood (smokers have values of 3% or more of total hemoglobin; values of up to 15% are possible, and the maximum normal value is 1.8%).

Measurement of tobacco metabolites (principally cotinine) in the urine, serum, or saliva is useful in research studies but unnecessary in routine care. Physicians are advised to use a documentation system for recording the test findings described above; meticulous recording makes it more likely that treatment for smoking cessation will be recommended (6).

Motivational strategies for smoking cessation

Many smokers who try to quit end up resuming their habit. It is estimated that only 3% to 6% of those who try to quit actually abstain from smoking for an entire year or more. A physician's mere advice to quit smoking does indeed have some effect and should be repeated at every suitable juncture, but the abstinence rate cannot be appreciably raised in this way. Modern

BOX 1

ICD-10 Diagnostic Criteria for Tobacco Dependence

- A strong desire or compulsion to take tobacco
- Difficulty controlling the onset, cessation, or quantity of tobacco-taking behavior
- Withdrawal phenomena on reduction or cessation of consumption (insomnia, nervousness, irritability, increased appetite, depressed mood); consumption to alleviate withdrawal phenomena
- Tolerance: increased doses of tobacco are needed to achieve the same effect
- Progressive neglect of other activities and interests because of tobacco use
- Persistent use despite overtly harmful consequences

techniques of physician-patient communication, based on Miller and Rollnick's conception of motivational interviewing (15), are intended to bring the smoker, through dialogue, to the realization that the long-term benefits of abstinence and the harm caused by smoking (damaged health, feeling of dependence, cost) vastly outweigh the short-term drawbacks of abstinence (fear of failure, fear of weight gain, loss of the function of smoking in overcoming feelings such as boredom, stress, anxiety) and the benefits of smoking (boosted social confidence, taste, rewarding effect of nicotine).

In one recommended counseling algorithm, smokers who are poorly motivated to quit can be counseled in five steps called "The Five R's" (6) (*Box 3*). Motivational interviewing is effective (RR = 1.27, CI = 1.14–1.42) (16), with a 12-month success rate of 5% to 10%.

More extensive counseling, in multiple sessions of at least 10 minutes each, is considered to be an effective mode of support that can be provided in a doctor's office, in the hospital, or even over the telephone. The efficacy of proactive telephone counseling has been demonstrated in meta-analyses (17) (*eBox 1*).

Psychotherapy

Motivation and resolve are important prerequisites for smoking cessation. Every smoker should be advised to make his or her own effort to quit. If this effort fails, or if the smoker feels unable to quit without help, then more extensive techniques based on

Motivation

In the motivational interview, the smoker should be made aware of the advantages and disadvantages of smoking and abstinence from smoking.

The "Five R's" counseling algorithm

- Demonstrate RELEVANCE of the problem
- Name the RISKS of smoking
- Explain the REWARDS of cessation
- Discuss the ROADBLOCKS to cessation
- REPEAT all of the above at each session

BOX 2

The Fagerström Test for Nicotine Dependence (FTND)

Please answer the following questions and add up the total score as indicated.

1. How soon after you wake up do you smoke your first cigarette?

Within 5 minutes	3 points
6 to 30 minutes	2 points
31 to 60 minutes	1 point
After 60 minutes	0 points

2. Do you find it difficult to refrain from smoking in places where it is forbidden, e.g., in church, at the library, in cinema, etc.?

Yes	1 point
No	0 points

3. Which cigarette would you hate most to give up?

The first one in the morning	1 point
All others	0 points

4. How many cigarettes/day do you smoke?

31 or more	3 points
21 – 30	2 points
11 – 20	1 point
10 or less	0 points

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

Yes	1 point
No	0 points

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

Yes	1 point
No	0 points

Modified from: Heatherton et al., 1991; Characterization of the degree of dependence, according to (12): 0–2, very low; 3–4, low; 5, medium; 6–7, high; 8–10, very high. Maximum possible score, 10 points.

psychotherapy should be used. The recommended elements of treatment are derived from behavioral therapy; there is inadequate evidence to support psychodynamically oriented treatments, because of the lack of relevant controlled trials. Cessation programs are based on the premises that psychological dependency arises by operant and classical conditioning, and that cognitive processes, personal values, and the functionality of tobacco consumption play a major role in maintaining smoking behavior. Such programs combine psychoeducation and motivational techniques with behavioral-therapeutic elements. Further important components are the use of external social aids, techniques to prevent the resumption of smoking, and ways of dealing with short-term recidivism.

These elements of treatment can be provided either in group therapy or in an individual therapeutic setting. In one popular model, a smoking cessation group of 6 to 12 patients undergoes treatment together in 6 to 10 sessions consisting of two 90 to 120 minute therapeutic units each.

Meta-analyses of the effect of psychotherapy have shown that individual smoking counseling is more effective than simple counseling (13.9% vs. 10.8%, $RR = 1.39$ [CI 1.24–1.57]) (18). Group therapy and individual counseling are the most effective types of treatment and are equally effective (19). Mean abstinence rates above 30% have been reported when at least 8 counseling sessions are combined with pharmacotherapeutic support (6).

Alternative, low-threshold smoking cessation aids, including self-help manuals and online smoking cessation programs based on behavioral therapy, can also be recommended. Their anonymity and ready availability lead some smokers to prefer them to group therapy. The efficacy of online programs has been inadequately studied to date (20) (*eBox 2*).

Supportive pharmacotherapy

From the perspective of addiction therapy, the main emphasis of professional support must lie in effectuating a change in the patient's behavior. Early symptoms of nicotine withdrawal can, however, lead patients to take up smoking again soon after they quit; their suppression makes abstinence easier to maintain in the first few weeks after cessation. Supportive pharmacotherapy yields long-term success

The severity of nicotine dependence

The Fagerström test for nicotine dependence (FTND, 12) measures the severity of dependence on a scale from 0 to 10 on the basis of the patient's answers to a six-item questionnaire.

Changed behavior

Changed behavior is the main prerequisite for long-term abstinence from smoking. Behavioral-therapeutic smoking cessation programs are the most effective of all.

rates as high as 22% (compared to ca. 10% for placebo treatment). When medications are combined with psychotherapeutic help, abstinence rates of ca. 20% or up to 30% can be achieved at 6 months (with nicotine chewing gum and varenicline, respectively). Medications that are approved in Germany for the support of tobacco abstinence include various nicotine-replacement preparations (patches, chewing gum, nasal sprays, inhalers, sublingual tablets, lozenges) as well as the antidepressant bupropion and the partial nicotine-receptor antagonist varenicline.

Medications that have been found to be effective aids to smoking cessation, but are not approved for this indication in Germany, include the partial nicotine-receptor antagonist cytisine (approved for this indication in eastern European countries), the tricyclic antidepressant nortriptyline, and the anti-hypertensive agent clonidine. In the next few paragraphs, we will summarize the main features of each of these medications.

Nicotine replacement is intended to give the smoker, for a limited time only, a steadily diminishing dose of nicotine without the toxic substances that accompany nicotine derived from cigarette smoke. The various products differ in the kinetics of nicotine release. Nicotine patches yield a constant serum nicotine concentration and thus prevent nicotine-withdrawal phenomena. Nicotine chewing gum, tablets, or inhalers yield a rapid increase in nicotine concentration and give the user a feeling of control over nicotine intake, but they do not adequately mimic the rapid nicotine release from a cigarette. Nicotine nasal spray (approved, but not marketed, in Germany) comes closest to doing so but, for this very reason, is the most likely of all smoking cessation aids to create dependence itself. Patients with severe withdrawal symptoms can be treated with a combination of products, e.g., a patch together with chewing gum or nicotine tablets. Nicotine replacement should be provided for eight to twelve weeks and gradually reduced during this time.

The side effects of nicotine administration are well known to smokers from their previous long-term consumption of nicotine via cigarettes. The individual nicotine replacement products can also have specific local side effects that are not produced by cigarette smoking (e.g., skin irritation, irritation of the nasal mucosa, hiccups, abdominal pain).

Supportive pharmacotherapy

Supportive pharmacotherapy helps the patient get through the short-term symptoms of withdrawal.

BOX 3

The “Five R’s” counseling algorithm

- **Relevance**

Based on knowledge of the patient's physical condition, familial and social situation, personal goals, health problems (if any), and possible prior attempts to quit smoking, the physician can explain to the patient how these are related to his or her current tobacco consumption.

- **Risks**

Again based on the above knowledge, the physician can explain the short- and long-term risks that smoking poses to the patient and the impact of these risks on the patient's family.

- **Rewards**

The smoker should understand and appreciate the potential personal advantages of quitting smoking.

- **Roadblocks**

Smokers who are willing to quit smoking but never actually make an attempt usually do so out of fear: fear of failure, fear of weight gain or depression, fear of withdrawal symptoms, or fear of unhappiness due to loss of the pleasant sensations of smoking.

- **Repetition**

Repetition is important! At every contact with the physician, the smoker should be asked about his or her current motivation to quit. Repetition gradually reinforces the motivation to quit.

Bupropion is a monocyclic, activating antidepressant that is structurally related to amphetamine. It mimics the effect of cigarette-derived nicotine by inhibiting the reuptake of noradrenaline and dopamine, and it is thought to reduce nicotine-withdrawal manifestations by this mechanism as well. Sleep disturbances are a very common side effect; common ones include (among others) tremor, headache, difficulty concentrating, dizziness, dry mouth, and gastrointestinal complaints. Epileptic seizures arise occasionally, and the drug is therefore contraindicated for patients who are at elevated risk of a seizure. The physician must also be aware of possible interactions with various other medications including antipsychotic agents, other antidepressants, and theophylline.

Varenicline exerts its effect at the nicotinic $\alpha 4 \beta 2$ -acetylcholine receptor, leading to saturation

Nicotine replacement therapy

The goal of nicotine replacement is to give the smoker, for a limited time only, a steadily diminishing dose of nicotine without the toxic substances that accompany nicotine derived from cigarette smoke.

BOX 4

Available medications for smoking cessation

- **Nicotine patches** (various systems, various strengths)
- **Nicotine chewing gum** (2 and 4 mg, various flavors)
- **Nicotine sublingual tablets** (2 mg)
- **Nicotine lozenges** (1.5 and 4 mg)
- **Nicotine inhalers** (10 mg)
- **Nicotine nasal spray** (no longer sold in Germany)
- **Bupropion** (by prescription only)
- **Varenicline** (by prescription only)

of the craving for smoking and preventing a subjectively positive effect of any additional nicotine taken up from cigarettes. Users report abnormal dreams, sleep disturbances, headache, and nausea as very common side effects; the common ones are dizziness, fatigue, and gastrointestinal complaints. Varenicline is contraindicated for use by pregnant women, children, and adolescents, as well as by smokers with mental illnesses in view of a few reported cases of suicidal thoughts and behavior. Varenicline can interact with cimetidine, warfarin, and nicotine replacement drugs.

The indication for either bupropion or varenicline should be considered carefully in view of the substantial likelihood of side effects. The patient can continue to smoke in the first few weeks of administration of either drug, while the dose is still rising. In this phase, most users already perceive cigarettes as less satisfying than before, and accordingly smoke less. The recommended duration of treatment is eight weeks for bupropion and twelve weeks for varenicline.

If the treatment succeeds, but the patient remains in danger of taking up smoking again, all of the approved products can be given for a longer time. None of them are recommended for underaged or pregnant patients, although pregnant women who cannot remain abstinent without this kind of help can take a nicotine replacement preparation under a physician's supervision. Nicotine replacement therapy is always better than cigarette smoking! (*Box 4*)

The efficacy of these drugs has been repeatedly studied and evaluated in meta-analyses. The superior effectiveness of nicotine replacement therapy over placebo has been documented, with $RR = 1.58$ ($CI = 1.50-1.66$) (21). The same is true of bupropion ($RR = 1.69$, $CI = 1.53-1.85$) and varenicline ($RR = 2.31$, $CI = 2.01-2.66$) (22, 23). Even though the latter two drugs seem to be more effective than nicotine replacement therapy, they are recommended less highly in the guidelines of the Drug Commission of the German Medical Association (7) because of their more severe side effects and risks. A recent meta-analysis of the available data from clinical trials revealed an elevated risk of cardiovascular events with varenicline use ($OR = 1.72$; 95% CI 1.09–2.71, frequency of events 1.06% in the varenicline group and 0.82% in the placebo group) (24).

Treatments with no evidence of efficacy

Other treatments such as acupuncture and hypnosis are popular but are not recommended in the current treatment guidelines. Meta-analyses of the use of acupuncture for smoking cessation have revealed long-term abstinence rates no different from those obtained with placebo treatment (approximately 8% for acupuncture versus 9% for placebo) (25). The data on hypnosis and hypnotherapy are so inconsistent that their use cannot be recommended (6). Nor is there any recognized proof of efficacy for other methods such as electrical or electronic cigarettes, various naturopathic and homeopathic medications, some medications that have already been mentioned above, and many other techniques that are of an esoteric nature or rely principally on the power of suggestion.

Certified training programs and the reimbursement of smoking cessation counseling and treatment

Even though tobacco consumption is a major direct or contributory cause of many diseases, the communication of information for the counseling of smokers and the treatment of dependent smokers who are willing to quit have long been neglected topics in medical school and in continuing medical education. A curriculum entitled *Tabakabhängigkeit* ("Tobacco Dependence") and certified by the German Medical Association has been available since 2008 (e2). This "blended-learning" program,

The duration of nicotine replacement therapy

Nicotine replacement should be provided for 8 to 12 weeks and gradually reduced during this time.

Treatments with no evidence of efficacy

Treatments such as acupuncture and hypnosis are popular but are not recommended in the current treatment guidelines.

FURTHER WEB ADDRESSES

- www.treatobacco.net (important non-commercial collection of information on tobacco, smoking, treatment, smoking control policy, etc.)
- www.anbieter-raucherberatung.de (a [German-language] directory of registered providers of smoking cessation treatment in Germany)
- www.dhs.de (German Center for Addiction Issues [*Deutsche Hauptstelle für Suchtfragen*])—smoking facts and statistics [in German])
- <http://www.dkfz.de/de/tabakkontrolle/Tabakentwoehnung.html> ([German-language] information on smoking cessation from the German Cancer Research Center)
- www.wat-ev.de (Scientific Task Force on Smoking Cessation [*Wissenschaftlicher Aktionskreis Tabakentwöhnung*], in German)

consisting of an Internet-based learning platform combined with two days of direct teaching, is offered by a number of the medical associations of the individual German federal states. The topics covered include the tobacco problem in its societal context, strategies for tobacco-control policy and medical intervention, the consequences of smoking and smoking cessation for health, the psychological and neurobiological basis of tobacco dependence, methods of diagnostic evaluation, counseling, and smoking cessation in the individual-treatment setting, and aids to the implementation of smoking cessation in clinical practice. Further training in how to conduct group therapy for smokers, e.g., according to the approved models *Rauchfrei* (“Smoke-Free”) or *Nichtraucher in 6 Schritten* (“Quit Smoking in 6 Steps”) (e3), is offered by local providers.

Trained therapists can register with a provider database (www.anbieter-raucherberatung.de) that is maintained by the German Federal Center for Health Education (*Bundeszentrale für gesundheitliche Aufklärung*, BZgA) and the German Cancer Research Center (*Deutsches Krebsforschungszentrum*, dkfz), stating which therapeutic technique(s) they use. This database helps counselors and smokers find the support they need.

In Germany, physician-provided counseling and treatment for the purpose of smoking cessation are reimbursed as “individual health care provisions” (*individuelle Gesundheitsleistungen*, *IGEL-Leistungen*), i.e., they are not paid for by the statutory health insurance carriers, but rather by the patients directly. The carriers do contribute to the cost of smoking cessation courses, as these are considered preventive measures under pertinent German health law (§20 SGB V), but they do not pay for

medication. Smoking cessation courses can cost 80 to 500 euros, depending on the type of course and on the provider; supportive pharmacotherapy for smoking cessation, in accordance with the guidelines, can cost up to 300 euros. The long-term efficacy of smoking cessation is higher when medical and psychological support for it are reimbursed (e4).

Recently, there have been calls for smoking cessation treatment to be regarded as part of the treatment of COPD, which would imply that its costs must be covered by statutory health insurance. An analogous classification would also be justifiable for smokers with other physical illnesses whose course would be positively influenced by smoking cessation, as well as for pregnant women who smoke and for persons diagnosed as tobacco-dependent.

Counseling and treatment options in primary care

Simple counseling strategies can also be successful; thus, physicians should address the issue of smoking with every smoker, taking a smoking history (daily cigarette consumption, attempts to quit) and inquiring about the smoker’s current motivation to quit. Instruments such as the FTND are useful aids to motivational work; motivational interviewing techniques,

which increase the smoker’s cognitive dissonance with regard to the continuation of smoking and create a motivation to quit, can be conducted in brief sessions according to the Five R’s model. If the patient cannot participate successfully in a smoking cessation program, and if telephone counseling, internet-based cessation programs, and self-help literature are not available, then weekly contacts with a physician to discuss progress and any difficulties in

Techniques for the counseling of smokers

Techniques for the counseling and support of smokers trying to quit are taught in the German Medical Association’s curriculum entitled *Tabakabhängigkeit* (“tobacco dependence”).

Reimbursement of smoking cessation therapy

In Germany, physician-provided counseling and treatment for smoking cessation are “individual health care provisions.” Insurers contribute to the cost of smoking cessation courses but do not pay for medication.

combination with supportive medication might be an appropriate alternative.

Persons who quit smoking can expect a long-term weight gain of 4 to 7 kg (e5, e6). Bupropion, varenicline, nicotine-replacement therapy, and medications such as dexfenfluramine or fluoxetine can counteract weight gain in the short term, but their long-term efficacy is uncertain. Weight can possibly be reduced over the long term by increased exercise (e6). The potential adverse effects of moderate weight gain are far outweighed by the benefits of tobacco abstinence (e5).

Conflict of interest statement

Prof. Batra has been a paid consultant for GlaxoSmithKline and Sanofi Aventis. He has received payment for conducting clinical trials for the McNeil, Pfizer, Sanofi, GlaxoSmithKline, Pfizer Consumer Health Care, and Alkermes companies. He serves as President of the Scientific Task Force on Smoking Cessation (*Wissenschaftlicher Aktionskreis Tabakentwöhnung*) and as coordinator of the tobacco dependency guidelines of the German Association for Psychiatry and Psychotherapy (*Deutsche Gesellschaft für Psychiatrie, Psychotherapie und Nervenheilkunde, DGPPN*) and the German Association for the Study and Treatment of Addiction (*Deutsche Gesellschaft für Suchtforschung und Suchttherapie, DG-Sucht*). He is the author of the smoking cessation program *Nichtraucher in 6 Wochen* ("Quit Smoking in 6 Weeks"), published by Kohlhammer Verlag.

Manuscript submitted on 2 May 2011, revised version accepted on 4 July 2011.

Translated from the original German by Ethan Taub, M.D.

REFERENCES

- Doll R, Peto R, Boreham J, Sutherland I: Mortality in relation to smoking: 50 years observations on male British doctors. *Br Med J* 2004; 328: 1519.
- John U, Hanke M: Tobacco smoking- and alcohol drinking-attributable cancer mortality in Germany. *Eur J Cancer Prev* 2002; 11: 11–17.
- Batra A: Tabakabhängigkeit und Raucherentwöhnung bei psychiatrischen Patienten. *Fortschritte Neurologie Psychiatrie* 2000; 68: 80–92.
- Bundeszentrale für gesundheitliche Aufklärung: Der Tabakkonsum Jugendlicher und junger Erwachsener in Deutschland 2010. Ergebnisse einer aktuellen Repräsentativbefragung und Trends. Köln: Bundeszentrale für gesundheitliche Aufklärung 2011.
- Statistisches Bundesamt: Raucher und Nichtraucher 2009. <http://de.statista.com/statistik/daten/studie/157730/umfrage/raucher-und-nichtraucher-in-deutschland-2009/>
- Fiore MC, Jaén CR, Baker TB, et al.: Treating tobacco use and dependence: 2008 Update. Clinical practice guideline. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service 2008.
- Arzneimittelkommission der Deutschen Ärzteschaft: Empfehlungen zur Therapie der Tabakabhängigkeit. *Arzneiverordnungen in der Praxis*, Band 37, Sonderheft 2. 2010.
- Andreas S, Batra A, Behr J, et al.: Tabakentwöhnung bei COPD – S3 Leitlinie herausgegeben von der Deutschen Gesellschaft für Pneumologie und Beatmungsmedizin. *Pneumologie* 2008; 62: 255–72.
- Andreas S, Hering T, Mühlig S, Nowak D, Raupach T, Worth H: Clinical practice guideline: Smoking cessation in chronic obstructive pulmonary disease—an effective medical intervention. *Dtsch Arztebl Int* 2009; 106(16): 276–82.
- Batra A, Schütz CG, Lindinger P: Tabakabhängigkeit. In: Schmidt LG, Gastpar M, Falkai P, Gaebel W (Hrsg.): Evidenzbasierte Suchtmedizin. *Behandlungsleitlinie Substanzbezogene Störungen*. Köln: Deutscher Ärzte-Verlag 2006; 91–142.
- Hughes JR, Helzer JE, Lindberg S: Prevalence of DSM/ICD-defined nicotine dependence. *Drug and Alcohol Dependence* 2006; 85: 91–102.
- Heatherton TF, Kozlowski LT, Frecker RC, Fagerström KO: The Fagerstrom Test for nicotine dependence: a revision of the Fagerstrom tolerance questionnaire. *British Journal of Addiction* 1991; 86: 119–127.
- Mucha RF, Pauli P: Die deutsche Version des Questionnaire on Smoking Urges (QSU-G). In: Glöckner-Rist A, Rist F, Küfner H (eds.), *Elektronisches Handbuch zu Erhebungsinstrumenten im Suchtbereich (EHES)*. Version 3.00. Mannheim: Zentrum für Umfragen, Methoden, und Analysen 2003.
- DiFranza JR, Savageau JA, Fletcher K, et al.: Measuring the loss of autonomy over nicotine use in adolescents: The development and assessment of nicotine dependence in youths (DANDY) study. *Archives of Pediatric Adolescent Medicine*. 2002; 156: 397–403.
- Miller WR, Rollnick S: *Motivational Interviewing (2nd edition)*. Preparing People for change. New York: Guilford 2002.
- Lai DTC, Cahill K, Qin Y, Tang JL: Motivational interviewing for smoking cessation. *Cochrane Database of Systematic Reviews*: Reviews 2010, Issue 1. John Wiley & Sons, Ltd Chichester, UK DOI: 10.1002/14651858.CD006936.pub2
- Stead LF, Perera R, Lancaster T: Telephone counselling for smoking cessation. *Cochrane Database of Systematic Reviews*: Reviews 2006, Issue 3. John Wiley & Sons, Ltd Chichester, UK DOI: 10.1002/14651858.CD002850.pub2
- Lancaster T, Stead LF: Individual behavioural counselling for smoking cessation. *Cochrane Database of Systematic Reviews*: Reviews 2005, Issue 2. John Wiley & Sons, Ltd Chichester, UK DOI: 10.1002/14651858.CD001292.pub2
- Stead LF, Lancaster T: Group behaviour therapy programmes for smoking cessation. *Cochrane Database of Systematic Reviews*: Reviews 2005, Issue 2. John Wiley & Sons, Ltd Chichester, UK DOI: 10.1002/14651858.CD001007.pub2
- Civiljak M, Sheikh A, Stead LF, Car J: Internet-based interventions for smoking cessation. *Cochrane Database of Systematic Reviews*: Reviews 2010 Issue 9 John Wiley & Sons, Ltd Chichester, UK DOI: 10.1002/14651858.CD007078.pub3
- Stead LF, Perera R, Bullen C, Mant D, Lancaster T: Nicotine replacement therapy for smoking cessation. *Cochrane Database of Systematic Reviews* 2008, Issue 1. Art. No.: CD000146. DOI: 10.1002/14651858.CD000146.pub3

Counseling and treatment options in primary care

Physicians should take a smoking history (daily cigarette consumption, attempts to quit) from every smoker and inquire about his or her current motivation to quit.

Weight gain after smoking cessation

Persons who quit smoking can expect a long-term weight gain of 4 to 7 kg. Weight can possibly be reduced over the long term by increased exercise.

22. Hughes JR, Stead LF, Lancaster T: Antidepressants for smoking cessation. Cochrane Database of Systematic Reviews: Reviews 2007, Issue 1. John Wiley & Sons, Ltd Chichester, UK DOI: 10.1002/14651858.CD000031.pub3.
23. Cahill K, Stead LF, Lancaster T: Nicotine receptor partial agonists for smoking cessation. Cochrane Database of Systematic Reviews 2008, Issue 3. Art. No.: CD006103. DOI: 10.1002/14651858.CD006103.pub3.
24. Singh S, Loke YK, Spangler JG, Furberg CD: Risk of serious adverse cardiovascular events associated with varenicline: a systematic review and meta-analysis. CMAJ (epub. 04.07.11)
25. White AR, Rampes H, Campbell J: Acupuncture and related interventions for smoking cessation. Cochrane Database of Systematic Reviews: Reviews 2006, Issue 1. John Wiley & Sons, Ltd Chichester, UK DOI: 10.1002/14651858.CD000009.pub2

Corresponding author

Prof. Dr. med. Anil Batra
Universitätsklinik für Psychiatrie und Psychotherapie
Sektion Suchtforschung und Suchtmedizin
Calwer Str. 14
D-72076 Tübingen, Germany
anil.batra@med.uni-tuebingen.de

For eReferences please refer to:
www.aerzteblatt-international.de/ref3311

Case illustration and eBoxes available at:
www.aerzteblatt-international.de/11m555

Further information on CME

This article has been certified by the North Rhine Academy for Postgraduate and Continuing Medical Education.

Deutsches Ärzteblatt provides certified continuing medical education (CME) in accordance with the requirements of the Medical Associations of the German federal states (Länder). CME points of the Medical Associations can be acquired only through the Internet, not by mail or fax, by the use of the German version of the CME questionnaire within 6 weeks of publication of the article. See the following website: cme.aerzteblatt.de

Participants in the CME program can manage their CME points with their 15-digit "uniform CME number" (*einheitliche Fortbildungsnummer, EFN*). The EFN must be entered in the appropriate field in the cme.aerzteblatt.de website under "meine Daten" ("my data"), or upon registration. The EFN appears on each participant's CME certificate.

The solutions to the following questions will be published in issue 41/2011. The CME unit "Hormonal Contraception" (issue 28–29/2011) can be accessed until 29 August 2011.

For issue 37/2011, we plan to offer the topic "Hereditary Cardiac Arrhythmias."

Solutions to the CME questionnaire in issue 25/2011:

Zahnert T: The Differential Diagnosis of Hearing Impairment.

Solutions: 1a, 2d, 3d, 4e, 5d, 6e, 7c, 8b, 9a–e, 10e.

(Note: Because of an error in the German version of Question 9, all answers receive full credit.)

Please answer the following questions to participate in our certified Continuing Medical Education program. Only one answer is possible per question. Please select the answer that is most appropriate.

Question 1

In the opinion of many authors, what percentage of smokers meet the ICD-10 definition of tobacco dependence?

- a) 10 to 20%
- b) 20 to 30%
- c) 30 to 40%
- d) 40 to 50%
- e) 50 to 60%

Question 2

Which of the following pieces of information is a proper and useful part of the diagnostic evaluation of a smoker?

- a) Urine cotinine concentration
- b) Carbon monoxide concentration in exhaled air
- c) Erythrocyte sedimentation rate
- d) History of accompanying alcohol consumption
- e) AUDIT

Question 3

Which of the following medications is approved in Germany for the supportive treatment of smokers at the start of smoking abstinence?

- a) Nortriptyline
- b) Moclobemide
- c) Fluoxetine
- d) Varenicline
- e) Clonidine

Question 4

Which of the following can be a symptom of tobacco withdrawal in a tobacco-dependent person?

- a) Fatigue
- b) Pruritus
- c) Dysequilibrium
- d) Tachycardia
- e) Irritability

Question 5

Which of the following interventions is a recommended behavioral-therapeutic element of smoking cessation treatment?

- a) Expansion of activities
- b) Exposure therapy
- c) Self-control methods

- d) Life review therapy
- e) Relaxation training

Question 6

For which patients is bupropion generally contraindicated?

- a) Depressed women
- b) Persons with epilepsy
- c) Diabetics
- d) The elderly
- e) Persons with impaired renal function

Question 7

Which of the following is a component of the "Five R's" counseling algorithm?

- a) Requirements
- b) Repetition
- c) Reprimands
- d) Repression
- e) Repatriation

Question 8

According to the German Federal Statistical Office, what percentage of the German population (age 15 and above) were smokers in 2009?

- a) About 6%
- b) About 16%
- c) About 26%
- d) About 36%
- e) About 46%

Question 9

What does the Fagerström test measure?

- a) The severity of nicotine dependence
- b) The carbon monoxide content of exhaled air
- c) The ability to concentrate
- d) The cotinine concentration in saliva
- e) The correlation between alcohol and nicotine dependence

Question 10

Which of the following is recommended by the Drug Commission of the German Medical Association as an aid to smoking cessation?

- a) Acupuncture
- b) Electronic cigarettes
- c) Hypnosis
- d) Nicotine replacement therapy
- e) Bioresonance therapy

CONTINUING MEDICAL EDUCATION

The Treatment of Tobacco Dependence

Anil Batra

eREFERENCES

- e1. Heinz A, Batra A: Neurobiologie der Alkohol- und Nikotinabhängigkeit. Stuttgart: Kohlhammer 2003.
- e2. Brösicke K, Kunstmann W: Nichtraucher: Ärztlicher Rat wirkt motivierend. Dtsch Arztebl 2008; 105 (8): A 380.
- e3. Batra A & Buchkremer G: Tabakabhängigkeit – Ein Leitfaden für Therapeuten. Stuttgart: Kohlhammer 2004.
- e4. Reda AA, Kaper J, Fikretler H, Severens JL, van Schayck CP: Healthcare financing systems for increasing the use of tobacco dependence treatment. Cochrane Database of Systematic Reviews: Reviews 2009, Issue 2. John Wiley & Sons, Ltd Chichester, UK DOI: 10.1002/14651858.CD004305.pub3
- e5. Pistelli F, et al.: Weight gain after smoking cessation. Monaldi Arch Chest Dis 2009; 71: 81–7
- e6. Parsons AM, et al.: Interventions for preventing weight gain after smoking cessation. Cochrane Database of Systematic Reviews 2009, Issue 1.

CONTINUING MEDICAL EDUCATION

Treatment of Tobacco Dependence

Anil Batra

Case Illustration

A 46-year-old man was admitted to the hospital with an acute coronary syndrome. He had smoked cigarettes since age 17, a total of 45 pack-years, recently about 40 cigarettes per day. His FTND score was 8. He had made one previous serious attempt to quit smoking (without supportive medication), which failed when he smoked a cigarette “to test himself” two months later. His reasons for smoking included what he perceived to be stress reduction, increased concentration, and relaxation attributable to smoking. Despite concern for his health and dissatisfaction with his own dependence on cigarettes, he had made no further attempts to quit, because he feared any such attempt would fail.

Smoking cessation counseling began with detailed patient education about the available types of support. The patient decided to stop smoking and agreed to come for regular follow-up visits over the ensuing

weeks. Nevertheless, he could not quit as desired because of marked nervousness, agitation, irritability, and sleep disturbances, and nicotine replacement therapy was recommended. In view of his high daily cigarette consumption and his marked nicotine dependence, combined treatment with a nicotine patch and nicotine chewing gum (4 mg) was prescribed, and this indeed reduced his craving for cigarettes. He succeeded in giving up cigarettes entirely by his chosen target date. In a subsequent six-week phase with weekly follow-up visits, he considered alternative means of stress reduction and relaxation, as well as ways to deal with situations that might lead him to take up smoking again. The nicotine replacement therapy was successfully tapered over the course of eight weeks of treatment, and then discontinued.

Cite this as:

Batra A: Treatment of tobacco dependence: Dtsch Arztebl Int 2011; 108(33): 555–64.DOI: 10.3238/arztebl.2011.0555

eBOX 1**Telephone counseling for smokers who want to quit**

A nationwide telephone counseling program for smokers who want to quit is offered by the German Federal Center for Health Education (*Bundeszentrale für gesundheitliche Aufklärung*, BZgA: 01805/313131) and the German Cancer Research Center (*Deutsches Krebsforschungszentrum*, dkfz: 06221/424200), providing advice, psychoeducation, and motivation by the motivational interviewing method.

eBOX 2**Some online smoking cessation programs**

- www.quitnet.com
- www.smokefree.gov

For German-language online smoking cessation programs please refer to the German version of this article