## Review Article

# Tobacco Cessation and Prevention Activities in Dental Clinics

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**Received:** 01-09-2013
**Revised:** 10-09-2013
**Accepted:** 12-09-2013

**ABSTRACT:** Tobacco use has seriously damaging effects on nearly every system in the body. It is the leading cause of preventable death in the world and an important cause of premature death. According to the World Health Organization (WHO), India is home to 12% of the world's smokers. Approximately 900,000 people die every year in India due to smoking as of 2009. There is evidence that smoking can cause at least 50 different diseases, including 30% of all cancers, 90% of all lung cancers, 30% of all ischaemic heart disease and strokes, and 70% of chronic lung diseases. The first area of the body to be affected by tobacco is the oral cavity. The use of both combustible and non combustible forms of tobacco increases the risk of coronal and root caries, periodontal disease, and oral cancer. Tobacco use is associated with oral precancerous lesions such as leukoplakia, erythroplakia and other mucosal lesions. Various models like 5 A's and 5 R's contribute in tobacco cessation. Medications are available worldwide which help people to quit tobacco. Dentists also play an important role in promoting tobacco cessation. Tobacco use being a public health problem is an important issue to be dealt by dentists and healthcare workers.

**Keywords** : Tobacco cessation, intervention, tobacco control programs.

**This article may be cited as:** Lakhanpal M, Rao NC, Gupta N, Vashist S. Tobacco cessation and prevention activities in dental clinics. J Adv Med Dent Scie 2013;1(2):116-124.

## Introduction:

Tobacco use has seriously damaging effects on nearly every system in the body.[1] It is the leading cause of preventable death in the world and an important cause of premature death.[2,3]

A smoker's life span is shortened by about five minutes for each cigarette smoked – this is about the amount of time that is spent smoking a cigarette. On average, those killed by smoking have lost 10–15 years of life.[3] There is evidence that smoking can cause at least 50 different diseases (Doll et al., 1994), including 30% of all cancers, 90% of all lung cancers, 30% of all ischaemic heart disease and strokes, and 70% of chronic lung diseases.[4] Worldwide, the picture is very bleak; with current smoking patterns, about 500 million people alive today will eventually be killed by tobacco use. By 2030, tobacco is expected to be the single biggest cause of death worldwide, accounting for about 10 million deaths per year. One-half of these deaths will occur among people 35 to 69 years of age, losing an average of 20 to 25 years of life. The

effects of tobacco use on the public's oral health also are alarming. All forms of tobacco—including cigarettes, cigars, pipes and smokeless tobacco—have been established as causal for oral and pharyngeal cancer and are responsible for more than 75 percent of deaths caused by these malignancies.[5]

Indian scenario is even more bleak with approximately 120 million smokers in India. According to the World Health Organization (WHO), India is home to 12% of the world's smokers. Approximately 900,000 people die every year in India due to smoking as of 2009. According to a 2002 WHO estimate, 30% of adult males in India smoke. Among adult females, the figure is much lower as between 3-5%.[6]

Between 1950 and 2000, over 70,000 scientific papers have shown that prolonged smoking causes premature death and disability.[7] In India, three large cohort studies conducted, first in late 1960s and mid-1970s in Srikakulam,[8] second in the late 1970s in Pune,[9] followed by another in mid-1980 in Ernakulam[10] and in the late-1990s to mid-2000 in Mumbai (Mumbai Cohort Study)[11] have confirmed the strong association between tobacco use and premature death. The Mumbai Cohort Study also associates premature death to smoking of bidis in addition to cigarettes.

The most recent study of mortality associated with smoking in India (2008), estimates that at least 930,000 adult deaths in India could be attributed to smoking, and that this would rise to over one million annually from 2010.[12] In effect, one in every 10 adult deaths in India is smoking-related. This is equivalent to a plane crashing every day and all the passengers being killed.

Smoking during pregnancy increases the chance of a premature birth, stillbirth, low-birth-weight baby, miscarriage, sudden infant death syndrome (SIDS), and six times greater chance of cleft palate formation.[13] Passive or second hand smoke from parents puts the children at an increased risk of developing colds, pneumonia, bronchitis, middle-ear infections, increased severity of symptoms in asthmatic children, reduction in lung function, and delayed development of permanent teeth by as many as 4 months.[14]

**Tobacco affecting oral health**

The first area of the body to be affected by tobacco is the oral cavity. The use of both combustible and non combustible forms of tobacco increases the risk of coronal and root caries, periodontal disease, and oral cancer.[15-18]

Tobacco use is associated with oral precancerous lesions such as leukoplakia, erythroplakia and other mucosal lesions. Leukoplakia is the most common precancerous lesion associated with smoking and/or chewing tobacco. Oral submucous fibrosis (OSMF) is emerging as a new epidemic, especially among the youth. The dramatic increase in OSMF among young people in India has been attributed to chewing *guthka and pan masala.*[19]

General practice dentists are ideally placed to deliver smoking cessation advice and assistance to their patients. Fifty per cent of smokers say they would try and quit if their dentist advised them to quit.[20] The dental team has a major role to play in smoking prevention. Evidence suggests that smoking cessation interventions are effective.[21,22] A brief intervention will often result in significant health gain and, in the long term, reduces smoking-related health-care costs to countries. All these diseases are preventable by removing one single risk factor i.e. tobacco use. Therefore it is very important for health professionals including dentists to educate their patients about the ill effects of tobacco and the ways to quit tobacco. Thus this review is planned with the objective to help the health care professionals to understand how can they help their patients to quit tobacco.

**Tobacco cessation and the role of the dentist**

As health professionals, the role of public health dentist is constantly expanding and can be as far reaching as a professional's imagination, sense of responsibility and efforts. This is attributed to their expertise in dental and oral matter; they are highly respected, trusted and influential community leaders in any society. Their voices are heard across a vast range of social, economic and political arenas. Thus, they constitute a "teachable moment" to the community and can perform a unique role in tobacco use cessation activities.[23-25]

**Role of dentist** [26,27]

- Convene office team to solicit support for the program and to determine the office plan of action.
- Appoint a dentist or hygienist as program coordinator. The coordinator will be responsible for tracking and assessing the effectiveness of the tobacco cessation interventions for each patient.
- Negotiate roles of other team members. Work with hygienist(s) to counsel patients (1-3 min) concerning oral effects of tobacco use and benefits of quitting.
- Refer patients to the free helpline, called National Tobacco Cessation Quit Line, which is now accessible from 9am to 9pm at the toll-free number: 1800-227787 for free coaching and information about local tobacco dependence treatment programs. Tobacco cessation counselling is provided in English, Hindi, Marathi, Gujarati and Bengali. Also, callers wanting on-ground support are referred to a local Tobacco Intervention Initiative (TII) centre of the Indian Dental Association (IDA). Currently there are 500 TII centres across India.[27]
- Recommend and prescribe nicotine replacement products; varenicline (Chantix); bupropion (Zyban); or a combination of bupropion and nicotine replacement medication (when appropriate).
- Establish meetings to monitor program progress and evaluate personnel time and commitment; reassign responsibilities if needed. Introduce new team members to program-related responsibilities; delegate training to appropriate personnel, when necessary.

**Table 1:** 5 A's model – for those who are ready to quit tobacco[26-29]

| Type | Point of emphasis |
|---|---|
| 1. Ask | Asking the tobacco use question is the first step in the coaching process. Tobacco users are often viewed as outcasts in our society. Because many of them feel defensive, it's wise to approach all tobacco cessation conversations with care and a sympathetic view. No one who starts using tobacco wants to become addicted. Present yourself as someone who wants to help your patient. |
| 2. Advise | In a clear, strong and personalized manner, urge every tobacco user to quit. |
| 3. Assess | In a caring manner, assess whether the tobacco user is willing to make a quit attempt. |
| 4. Assist | Combination of coaching and medication gives your patient the best chance of becoming a successful quitter. Whether you are with a patient who wants to quit or with a patient who has no interest in quitting, helping both groups to become ex-tobacco users is your ultimate goal. If your patient tells you s/he wants to quit using tobacco and welcomes your help, praise their decision and open a discussion about their history of quitting, if any. |
| 5. Arrange | Tobacco dependence is an addiction. Quitting is challenging for most tobacco users. The patient who is trying to quit should have follow-up options when s/he leaves your office. This is especially important when the treatment is shared by a team of clinicians and includes treatment extenders such as quit line counseling. Urge the patient who is making a quit attempt to contact their primary care provider about their plan to make a quit attempt. This will give your patient the best chance of being a successful quitter. |

**Table 2**: 5 R's model – for those who are not ready to quit[26-29]

| Type | Point of emphasis |
|---|---|
| 1. Relevance | Encourage the patient to indicate why quitting is personally relevant, being as specific as possible. Motivational information has the greatest impact if it is relevant to a patient's disease status or risk, family or social situation (e.g., having children in the home), health concerns, age, gender and other important patient characteristics (e.g., prior quitting experience, personal barriers to cessation). |
| 2. Risks | The clinician should ask the patient to identify potential negative consequences of tobacco use. Eg. Acute, long term and environmental risks. |
| 3. Rewards | The clinician should ask the patient to identify potential benefits of stopping tobacco use. Eg improved health, saving money, food tastes better, better self esteem etc. |
| 4. Roadblocks | The clinician should ask the patient to identify barriers or impediments to quitting and provide treatment (problem-solving counseling, medication) that could address barriers. Eg: fear of failure, weight gain, lack of support, depression, enjoyment of tobacco etc. |
| 5. Repetition | The motivational intervention should be repeated every time an unmotivated patient visits the clinic setting. Tobacco users who have failed in previous quit attempts should be told that most people make repeated quit attempts before they are successful and that you will continue to raise their tobacco use with them. |

**Models for the tobacco quitters**

Many tobacco users visit a dental office every year, so it is important that dentists and oral health care professionals be prepared to intervene with those who are willing to quit. The five major steps (the "5 As") to intervention in the primary care setting are listed in Table 1.These patients may respond to a motivational intervention built around the "5 Rs": relevance, risks, rewards, roadblocks and repetition (Table 2).

**Role of Medication in Tobacco Cessation[28,29]**

Dental clinicians need to offer the option of pharmacotherapy to all patients initiating a quit attempt. All seven of the FDA-approved medications for treating tobacco use are recommended: bupropion SR, nicotine gum, nicotine inhaler, nicotine lozenge, nicotine nasal spray, the nicotine patch and varenicline. These medications have been found to be safe and effective for the tobacco dependent. All smokers trying to quit should be offered medication (First line pharmacotherapy options), except where contraindicated or for specific populations for which there is insufficient evidence of effectiveness (i.e., pregnant women, smokeless tobacco users, light smokers and adolescents).[28]

a. **Bupropion SR 150:** Advised 150mg each morning (OD) for first 3 days and BD for the 4th day. Start the drug 1-2 Weeks before quit date and use it from 2 to 6 months. It is contraindicated if one is taking monoamine oxidase (MAO) inhibitor, bupropion in any other form, one is having a history of seizures and eating disorders. Insomnia and dry mouth are the side effects.
b. **Nicotin gum (2mg or 4mg):** Advised 1 piece for every 1-2 hrs, 6-16 pcs per day. If one smokes ≤ 24 cigs then advise 2mg else 4mg. Treatment is continued till 12 weeks or more of needed. Denture wearers are cautioned for this modality. Users are advised not to eat or drink 15minutes before or during use. Mouth soreness and stomach ache are its side effects.
**c. Nicotine inhaler:** Advised 6-16 cartridges per day and 80 inhales per cartridge and if cartridge is saved then use it next day. Inhalers are to be used for 6 months and the dosage taper at end. It may irritate throat/mouth at first use but it improves upon use.
**d. Nicotine lozenge (2mg or 4 mg):** if one smokes ≥ 30 minutes after waking then

2 mg is prescribed else 4 mg. For the first 6 weeks 1 lozenge is advised for every 1-2 hrs, for the next 7-9 weeks 1 lozenge for every 2-4 hrs and for the next 10-12 weeks 1 lozenge for every 4-8 hrs. Users are advised not to drink or eat 15 min before or during use, take one lozenge at a time and not more than 20 lozenges in 24 hrs. Hiccups, cough, heartburn are its side effects.

e. **Nicotine nasal spray:** 1 dose means 1 squirt per nostril. Maximum dose is 1-2 doses per hour and 8-40 doses per day. Users are advised not to inhale the spray. It is contraindicated in asthmatic patients. It may cause nasal irritation but improves over time.
f. **Nicotine patch (7mg, 14mg and 21mg):** If person smokes ≥ 10 cigs/day then 21 mg is prescribes for 4 wks, 14 mg 2-4 wks or 7 mg 2-4 wks. Treatment lasts for 8-12 weeks. Local skin irritation and insomnia are the most common side effects.
g. **Varenicline:** 0.5 mg every morning is advised for the first 3 days, 0.5mg twice daily from 4-7$^{th}$ day and 1mg twice daily from 8$^{th}$ day till the treatment lasts. Treatment begins 1 week before quit date and use it for 3-6 months. Nausea, insomnia, abnormal, vivid or strange dreams are the side effects of the drug.
h. **Combinations** like patch+bupropion, patch+gum, patch+lozenge or inhaler can also be used.

Despite the relative efficacy of first-line medications, many smokers relapse after one given quit attempt, and alternative pharmacotherapies are needed. Clonidine and nortriptyline have been proposed as second-line medications.

**Nortriptyline**

The tricyclic antidepressant nortriptyline has been shown to approximately double cessation rates compared to placebo (OR=2.1).[30,32] A recent systematic review shows that the use of nortriptyline for smoking cessation resulted in higher prolonged abstinence rates after at least 6 months compared to placebo treatment.[33] The efficacy of nortriptyline does not appear to be affected by a past history of depression; it is, however, limited in its application by its potential for serious side effects. These include dry mouth, constipation, nausea, sedation and headaches, and a risk of arrhythmia in patients with cardiovascular disease. It can be dangerous in overdose. The dose of nortriptyline used for smoking cessation is approximately 75 mg per day for 12 weeks. Further information about dose titration can be obtained from the New Zealand smoking cessation guidelines.[31]

In addition to helping current users quit, dental offices may provide an excellent setting for delivering tobacco prevention messages to young people.[23] Adolescents substantially underestimate their personal risk of disease or death from the use of tobacco and overestimate the ease of quitting. Health care providers can play an important role in educating their patients (including nonusers) on the risks of using tobacco. One unique aspect of dentistry is that some of the adverse health effects of tobacco use are clinically apparent in the oral cavity in even relatively early stages of use. Oral manifestations can help personalize the interventions and increase their effectiveness, particularly among young users in the early stages of tobacco initiation.[34,35]

**Drug Interaction with Smoking** [26,27,34]

Many interactions between tobacco smoke and medications have been identified. In most of the cases it is the tobacco smoke which causes drug interactions not the nicotine. Tobacco smoke may interact with medications through pharmacodynamic (PD) or pharmacokinetic (PK) mechanisms.

**Table 3:** Mechanism of interactions and its effects of various drugs.

| Drug/Class | Mechanism of interactions and its effects |
|---|---|
| Alprazolam | Conficting data on significance of PK interaction. Possible decrease plasma concentrations (upto 50%); decrease half life (35%). |
| Caffeine | Likely increase caffeine levels after cessation. |
| Chlorpromazine | Decreased Sedation and hypotension possible in smokers; smokers may need increased dosages. |
| Clozapine | Increased levels upon cessation may occur; closely monitor drug levels and reduce dose as required to avoid toxicity. |
| Fluvoxamine | Dosage modifications not routinely recommended but smokers may need increased dosages. |
| Heparin | Mechanism unknown but increased clearance and decreased half-life are observed. Smoking has prothrombotic effects. Smokers may need increased dosages due to PK and PD interactions. |
| Insulin | PK & PD interactions likely not clinically significant; smokers may need increased dosages. |
| Propranolol | Increased Clearance (77%; via side-chain oxidation and glucuronidation) |
| Tacrine | Increased Metabolism (induction of CYP1A2); decreased half-life (50%); serum concentrations three-fold lower. Smokers may need Increased dosages. |
| Theophylline | Levels should be monitored if smoking is initiated, discontinued, or changed. Increased Clearance with second-hand smoke exposure. Maintenance doses are considerably higher in smokers. |
| Tricyclic antidepressants | Possible interaction with tricyclic antidepressants in the direction of decreased blood levels, but the clinical importance is not established. |
| **Pharmacodynamic Interactions** | |
| Benzodiazepines (diazepam, chlordiazepoxide) | Decreased sedation and drowsiness, possibly caused by nicotine stimulation of central nervous system. |
| Beta-blockers | Less effective antihypertensive and heart rate control effects; might be caused by nicotine-mediated sympathetic activation. Smokers may need increased dosages. |
| Corticosteroids (inhaled) | Smokers with asthma may have less of a response to inhaled corticosteroids. |
| Hormonal contraceptives | Increased risk with age and with heavy smoking (15 or more cigarettes per day) and is quite marked in women age 35 and older. |
| Opioids (propoxyphene, pentazocine) | Decreased analgesic effect; smoking may increase the metabolism of propoxyphene (15–20%) and pentazocine (40%). Mechanism is unknown. Smokers may need increased opioid dosages for pain relief. |

**Tobacco cessation at community level**

At the community level, local dental societies and dentists can become involved in local tobacco control coalitions, which function to mobilize and empower the community to make the changes that support nonuse of tobacco. Community-based programs have included activities such as educating the public on the health hazards of environmental tobacco smoke, promoting smoke-free restaurants, and encouraging policies and programs that support prevention and cessation of tobacco use.[35]

Dental schools need to incorporate into their curricula not just didactic instruction on the oral health impact of tobacco use, but practical training in clinical intervention (for example, role-playing discussions between dentists and patients). The next generation of dentists and dental hygienists should graduate with competency in assessing and treating tobacco use.[35] Given the enormous public

health burden imposed by tobacco use, it is critical that all healthcare clinicians address this issue. Smoking and tobacco use directly and negatively impact oral health and extant research indicates that dental professionals can have an impact on the health behaviours of patients. Thus, it is very important that dentists and hygienists intervene with their patients that use tobacco.

## Conclusion

From this review we conclude that the tobacco cessation interventions are more successful in dental clinics and school/community settings rather than usual care in tobacco cessation. Initiatives for professional development in smoking cessation should focus on dentists' limited confidence and ability to implement smoking cessation interventions systematically and their ambivalence about including smoking cessation in their role as a dentist. The Surgeon General of the Public Health Service, Dr. C. Everett Koop, has called smoking-"the chief, single avoidable cause of death in our society and the most important public health issue of our time".[36] While many questions remain to be answered by further research on how to improve the effectiveness of antismoking techniques, several options are open to dentists who wish to help combat this health menace. Dentists can serve as nonsmoking role models, provide information about the health hazards of smoking, give advice, refer patients to cessation programs, recommend cessation measures, and monitor patients' efforts to quit smoking.[37] A great deal has been learned about what is effective in communities and clinical settings, so comprehensive tobacco control programs must be implemented to have significant reductions in tobacco usage.

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Source of support: Nil

Conflict of interest: None declared