

Tobacco Use Cessation Services and the Role of the Dental Hygienist — *A CDHA position paper*

by the Canadian Dental Hygienists Association

POSITION STATEMENT ON TOBACCO USE CESSATION SERVICES AND THE ROLE OF THE DENTAL HYGIENIST

October 2004

Whereas,

1. tobacco use has a devastating effect on general health and a significant negative impact on oral health;
2. tobacco use cessation services provided by dental hygienists have a significant positive impact on quit rates;
3. all forms of tobacco including cigarettes, pipe, cigar and spit tobacco cause addiction and detrimental health effects;
4. the public generally expects oral health professionals to provide tobacco use cessation services;

The Canadian Dental Hygienists Association declares that,

1. dental hygienists have a key role to play as a member of an inter-disciplinary health professional team, where each member delivers a consistent tobacco use cessation message;
2. dental hygienists have a professional responsibility to provide tobacco use cessation services, as a routine component of dental hygiene practice;
3. it is imperative that tobacco use cessation services are an integral part of oral health services;
4. spit tobacco, cigars and pipes are not safe alternatives to cigarettes.

RECOMMENDATIONS ON TOBACCO USE CESSATION SERVICES AND THE ROLE OF THE DENTAL HYGIENIST

Dental hygienists can

- play an important role in preventing and eliminating tobacco use by identifying tobacco users, documenting tobacco use history, offering brief advice and written materials, as a routine part of clinical practice;
- change clinical culture and clinical practice patterns so that every client who uses tobacco is identified and offered at least brief counselling;
- obtain increased knowledge about tobacco use cessation by discussing the topic with colleagues, reading articles, or participating in continuing education opportunities;
- display self-help tobacco use cessation materials and provide additional resources for clients;
- establish tobacco use cessation clinics;
- act as change agents by advocating for policy changes and community-based initiatives that would help reduce tobacco use such as enacting smoke-free ordinances, supporting effective health promotion campaigns, increasing tobacco taxation, restricting tobacco advertising, and reducing tobacco use placement in movies.

Dental hygiene professional associations can

- develop and provide tobacco use cessation continuing education programs;
- take a role in promoting the reimbursement of tobacco use cessation services through dental insurance plans;
- encourage provincial governments to recognize dental hygiene tobacco cessation services as effective and essential public health promotion services that will aid in reducing the long-term negative effects of tobacco use;
- act as change agents by advocating for policy changes and community-based initiatives that would help reduce tobacco use, such as enacting smoke-free ordinances, supporting effective health promotion campaigns, increasing tobacco taxation, restricting tobacco advertising, and reducing tobacco use placement in movies.

Dental hygiene educational institutions can

- integrate didactic and clinical education in tobacco use cessation services from the inception of the student's dental hygiene education;
- encourage students to integrate tobacco use screening, prevention, and cessation services as a routine part of dental hygiene services provided to clients;
- provide increased continuing education on tobacco use cessation services.

Dental insurance plans can

- consider tobacco use cessation services and pharmacotherapeutic treatments, as a reimbursed benefit, just as they would reimburse other chronic conditions;

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- consider covering expenses for nicotine replacement therapy and bupropion for tobacco cessation.

Public health departments can

- utilize the dental hygienist's expertise in the provision of tobacco use cessation and prevention programs;
- consider covering expenses for nicotine replacement therapy and bupropion for tobacco cessation within medication insurance plans.

Federal and provincial governments can

- increase funding for tobacco use cessation services for all tobacco users, particularly those in the highest need groups such as Aboriginal peoples and youth;
- take a more pro-active approach to tobacco cessation and develop a "call to action" to promote tobacco use cessation;

- cover expenses for nicotine replacement therapy and bupropion for tobacco cessation within medication insurance plans.

Researchers can

- determine availability of, usage of, and barriers to obtaining tobacco use cessation continuing education;
- determine the extent of involvement of Canadian student clinics in providing tobacco use cessation services;
- develop new tobacco cessation continuing education programs for dental hygienists;
- assess and make recommendations for improvements to undergraduate curricula on tobacco use cessation;
- conduct further studies to determine the efficacy of dental hygiene delivered tobacco use cessation services, particularly for special populations, such as women, youth and Aboriginal peoples;
- investigate dental hygienists' ethical obligations in the provision of tobacco cessation services.

DÉCLARATION CONCERNANT LE RÔLE DE L'HYGIÉNISTE DENTAIRE DANS LES SERVICES DE DÉSACCOUTUMANCE AU TABAC

Octobre 2004

Attendu :

1. Que le tabagisme a des effets dévastateurs sur la santé générale et d'importantes répercussions négatives sur la santé buccodentaire;
2. Que les interventions des hygiénistes dentaires visant le renoncement au tabac ont un effet positif marqué sur les taux d'abandon;
3. Que toutes les formes de tabac – cigarette, pipe, cigare et tabac à priser – produisent une accoutumance et des effets néfastes pour la santé;
4. Le public s'attend habituellement à ce que les professionnels de la santé buccodentaire offrent des services de désaccoutumance au tabac;

L'Association canadienne des hygiénistes dentaires déclare :

1. Que les hygiénistes dentaires ont un rôle clé à jouer, soit de travailler en collaboration avec d'autres professionnels de la santé à livrer un message cohérent au sujet du renoncement au tabac;
2. Que les hygiénistes dentaires ont la responsabilité professionnelle de fournir des services de désaccoutumance au tabac qui constituent un élément habituel de la pratique de l'hygiène dentaire;
3. Qu'il faut absolument que les services de désaccoutumance au tabac fassent partie intégrante des services de santé buccodentaire;
4. Que le tabac à priser, le cigare et la pipe ne sont pas des solutions de rechange dépourvues de risques.

RECOMMANDATIONS CONCERNANT LE RÔLE DE L'HYGIÉNISTE DENTAIRE DANS LES SERVICES DE DÉSACCOUTUMANCE AU TABAC

Les hygiénistes dentaires peuvent :

- Jouer un rôle important dans la prévention et l'élimination du tabagisme en identifiant les consommateurs de tabac, en consignnant par écrit leurs habitudes en matière de consommation de tabac, en leur donnant de brefs conseils et de la documentation dans le cadre habituel de leur pratique clinique;
- Modifier la culture clinique et les tendances de la pratique clinique afin d'identifier tous les clients qui consomment du tabac et de leur offrir au moins de brefs conseils;
- Se familiariser avec la désaccoutumance au tabac en discutant de la question avec des collègues, en lisant des articles ou en participant à des séances de formation professionnelle continue;
- Mettre à l'étalage de la documentation autodidactique sur le renoncement au tabac et fournir des ressources additionnelles aux clients;
- Mettre sur pied des cliniques de désaccoutumance au tabac;

- Agir comme agents de changement en prônant des modifications aux politiques et des initiatives communautaires qui contribueront à réduire le tabagisme – la prise d'ordonnances portant interdiction de fumer, l'appui à des campagnes de promotion de la santé efficaces, la hausse des taxes sur le tabac, la limitation de la publicité sur le tabac et la réduction du placement du tabac dans les films, par exemple.

Les associations professionnelles d'hygiénistes dentaires peuvent :

- Concevoir et offrir des programmes de formation continue sur la désaccoutumance au tabac;
- Intervenir dans la promotion du remboursement des services de désaccoutumance au tabac par les régimes d'assurance-soins dentaires;
- Encourager les gouvernements provinciaux à reconnaître les services d'hygiène dentaire relatifs à la désaccoutumance au tabac comme des services de promotion de la santé efficaces et essentiels qui contribueront à réduire les effets négatifs à long terme du tabagisme;
- Agir comme agents de changement en prônant des modifications aux politiques et des initiatives communautaires qui contribueront à réduire le tabagisme – la prise d'ordonnances portant interdiction de fumer, l'appui à des campagnes de promotion de la santé, la hausse des taxes sur le tabac, la limitation de la publicité sur le tabac et la réduction du placement du tabac dans les films, par exemple.

Les établissements d'enseignement de l'hygiène dentaire peuvent :

- Intégrer l'enseignement didactique et clinique relatif aux services de désaccoutumance au tabac dès le début de la formation des étudiants en hygiène dentaire;
- Encourager les étudiants à intégrer les services de dépistage et de prévention du tabagisme et de désaccoutumance au tabac dans le cadre normal des services d'hygiène dentaire offerts aux clients;
- Offrir davantage de formation continue au sujet des services de désaccoutumance au tabac.

Les régimes d'assurances-soins dentaires peuvent :

- Considérer les services de désaccoutumance au tabac et les traitements pharmacothérapeutiques comme des prestations remboursables, tout comme elles le font pour les traitements visant d'autres états chroniques;
- Songer à couvrir les frais relatifs à la thérapie de substitution de nicotine et au bupropion utilisé pour la désaccoutumance au tabac.

Les ministères de la Santé publique peuvent :

- Faire appel aux compétences particulières des hygiénistes dentaires en matière de prestation de programmes de prévention du tabagisme et de désaccoutumance au tabac;
- Songer à intégrer les frais relatifs à la thérapie de substitution de nicotine et au bupropion utilisé pour la désaccoutumance au tabac à la couverture offerte par les régimes d'assurance médicaments.

coutumance au tabac à la couverture offerte par les régimes d'assurance médicaments.

Le gouvernement fédéral et les gouvernements provinciaux peuvent :

- Augmenter le financement des services de désaccoutumance au tabac destinés à tous les consommateurs de tabac et, plus spécialement, à ceux qui font partie des groupes qui en ont le plus besoin, comme les Autochtones et les jeunes;
- Adopter davantage une attitude proactive à l'égard de la désaccoutumance au tabac et concevoir un « appel à l'action » pour promouvoir le renoncement au tabac;
- Couvrir les frais relatifs à la thérapie de substitution de nicotine et au bupropion utilisé pour la désaccoutumance au tabac dans les régimes d'assurance médicaments.

Les chercheurs peuvent :

- Déterminer l'accessibilité et le recours à la formation permanente concernant la désaccoutumance au tabac et évaluer les obstacles à l'obtention d'une formation de ce genre;
- Définir dans quelle mesure les cliniques didactiques canadiennes offrent des services de désaccoutumance au tabac;
- Concevoir, à l'intention des hygiénistes dentaires, de nouveaux programmes de formation continue en matière de désaccoutumance au tabac;
- Évaluer les programmes d'études collégiales et de premier cycle sur la désaccoutumance au tabac et formuler des recommandations en vue de les améliorer;
- Effectuer d'autres études pour déterminer l'efficacité des services de désaccoutumance au tabac offerts par les hygiénistes dentaires, en particulier auprès de populations particulières telles que les femmes, les jeunes et les Autochtones;
- Examiner les obligations morales des hygiénistes dentaires en ce qui a trait à la prestation de services de désaccoutumance au tabac.

METHODOLOGY

This paper is based on a systematic review of literature, focusing primarily on the role of the dental hygienist in tobacco use cessation. A detailed search of relevant international English language research from 1981 to 2004 was carried out using MedLine and Cinahl databases and the Cochrane controlled trials register. The main focus, however, was on current literature from 1999 to 2004.

The search was expanded by reviewing "grey" literature, information not reported in scientific periodicals, as well as websites known to contain publications on this topic. In addition, the researcher manually searched references cited in the database search articles. Journals that were not indexed on these databases but that were relevant to the topic were identified from the CDHA collection. Finally, recognized experts in the topic area were contacted for identification of other relevant articles that may not have been identified. Animal studies were excluded; human studies

Table 1. Smoking rates in Canada, 2003

Area	Current smokers (%)
Canada	20
Newfoundland and Labrador	23
Prince Edward Island	23
Nova Scotia	22
New Brunswick	24
Quebec	23
Ontario	19
Manitoba	21
Saskatchewan	21
Alberta	21
British Columbia	16

Approximately 15% of youth aged 15 to 19 years of age were smoking, with girls smoking more than boys (19% vs. 16%).

were included. The following MeSH (medical subject headings) terms were used in the searches: dental hygienists, smoking cessation, tobacco use cessation, drug therapy, behaviour therapy, exercise therapy, acupuncture therapy, self-help groups, literature review, meta-analysis, systematic review (publication type) and practice guidelines.

Input from CDHA members was obtained in two ways; first, an e-mail broadcast and a notice in the *Probe* journal invited members to provide input, and second, a draft paper was posted on the CDHA web site and member input was obtained through an internet survey. In addition, a peer review process allowed the author to incorporate input from topic experts.

WHO USES TOBACCO?

According to the Canadian Tobacco Use Monitoring Survey,¹ the prevalence of smoking varies by age, gender, geographical location, and ethnicity. There were over 5 million people aged 15 years and older smoking in Canada in 2003, representing approximately 21% of the population. Approximately 23% of men and 18% of women were smoking. The highest prevalence of smoking occurs among Canada's young adults, aged 20 to 24, where 30% indicated that they smoked. Approximately 15% of youth aged 15 to 19 years of age were smoking, with girls smoking more than boys (19% vs. 16%). There are regional differences in smoking, with British Columbia showing the lowest prevalence and New Brunswick the highest (see table 1). First Nations peoples, Inuit, and immigrants all have a higher prevalence of smoking than the average Canadian, with the first two groups showing a prevalence over twice as high as the general population.^{2,3} The last group has a prevalence of 23.8%.⁴ About 1% of Canadians

use spit tobacco, with the highest provincial rate of 1.4% in Alberta.⁵

Spit tobacco

There are two types of smokeless or spit tobacco. Both are addictive and cause a significant negative impact on health. The first type is snuff that is a finely ground or shredded tobacco and that comes in either wet or dry. The dry form can be inhaled, but wet snuff is the more common form. Users of wet snuff place a "dip" or sachet of snuff between the lip or cheek and gum where it stays until swallowed or spit out.⁷ The second type of spit tobacco is chewing tobacco, a coarsely cut tobacco. Users put a "wad" of tobacco in their cheek and chew on it.

This paper uses the term "spit tobacco" instead of "smokeless tobacco" to avoid a possible association between "smokeless tobacco" and a product that is less harmful than smoking. It should be noted that both smoking and smokeless tobacco are harmful.

Spit tobacco use produces higher nicotine levels in the body than cigarette smoking. An average dose of 7.9 g of chewing tobacco in the mouth for 30 minutes produces an average of 4.5 mg of nicotine; 2.5 g of moist snuff kept in the mouth for 30 minutes produces an average of 3.6 mg nicotine; one cigarette produces an average of 1.0 mg of nicotine.⁸ The higher level of nicotine produced by spit tobacco may result in a dependence more easily formed than with cigarette smoking.

There is a low prevalence of spit tobacco use in the general Canadian population, with 1% of the male population using this product.⁹ The highest prevalence of spit tobacco use is found in Saskatchewan and Alberta, with 2% and 1.4% of the population respectively using it.⁹ Spit tobacco use is higher in the Aboriginal population than the general population.¹⁰ It is also higher in athletes than the general population, with high rates reported for players in hockey (47%), football (36%), and soccer (22%). Other athletes, including those playing baseball, golf, lacrosse, water polo, and wrestling may also use spit tobacco.¹¹ Some athletes believe that spit tobacco improves performance but studies do not support this.¹² A 1992 study in Calgary found that the age of initiation for spit tobacco use was just over nine years.¹³ Given the high risk for cancer, early initiation creates a serious health risk for these individuals.

THE COMPLEXITIES OF ADDICTION

Tobacco addiction is composed of three components: (1) pharmacologic—the nicotine addiction causing the physical addiction; (2) behavioural¹⁴—the habit formation; and (3) psychological and social—related to the time of day and situations that prompt you to smoke. Nicotine dependence may be measured by the amount of time that elapses after waking in the morning before the first cigarette is lit. In 1999, 25% of smokers were highly dependent, that is, they smoked their first cigarette within 5 minutes of awakening, while 32% showed moderately high dependence, by smoking within 6 to 30 minutes of awakening.¹⁵

To explore the association between mental health and

smoking, the mental health of 4,000 nicotine and non-nicotine dependent smokers were compared.¹⁶ Nicotine dependent smokers smoked 20 cigarettes per day on average; the non-nicotine dependent smokers smoked on average 14 cigarettes per day. More than half of the nicotine dependent subjects reported at least one of the following types of mental disorders including anxiety disorders, depressive disorders, somatoform disorders, and substance abuse other than nicotine dependence. In comparison, only one-quarter of the non-smokers and non-nicotine dependent subjects reported at least one of these mental disorders. Although this study does not show that heavy smoking leads to poor mental health, it does show that the two are associated.

GENERAL HEALTH RISKS

Tobacco use has profound health risks that include chronic diseases, early morbidity, and mortality. It harms nearly every major organ of the body. People using tobacco not only place their health at risk, but also their lives. One-half of regular smokers will die from smoking-related illness and one-half of those deaths occur prematurely in middle age from ages 35 to 65.¹⁷ The following statistics will give you a vivid picture of what these statistics mean in terms of the number of lives lost. Tobacco kills four times as many people as traffic accidents, suicide, AIDS, and murder combined.¹⁸ Approximately 40,000 people in Canada die each year from tobacco-related illnesses. World-wide, tobacco kills three million people every year, or one every second, and that number is expected to rise to 10 million by the year 2025.¹⁸

Smoking harms the whole body and causes the following illnesses:¹⁹

- Cancers of the mouth, throat, larynx, lung, esophagus, pancreas, kidney, bladder, stomach, cervix, and acute myeloid leukaemia

Nicotine dependence may be measured by the amount of time that elapses after waking in the morning before the first cigarette is lit.

- Cardiovascular disease, including sub-clinical atherosclerosis, strokes, coronary heart disease, and abdominal aortic aneurysm
- Respiratory diseases, including chronic obstructive pulmonary disease (COPD); and acute respiratory illness, including pneumonia
- Impaired lung growth in childhood and adolescence

Statistics on the health impact of smoking:¹⁹

- Smokers are about 20 times more likely to develop lung cancer than non-smokers.
- Smokers are four times more likely to die from heart disease.
- Chronic obstructive pulmonary disease is the fourth leading cause of death in the United States; smoking causes more than 90% of these deaths.

Prenatal maternal smoking is an important health issue since a number of women continue to smoke during pregnancy. In fact, a Canadian longitudinal study of newborn infants indicates that between 11% and 23.3% were exposed to nicotine prior to birth.^{6,20} Pregnant women who smoke risk not only negative health outcomes for themselves but also for their child; more importantly, they are risking possible death for their infant. Table 2 shows a list of the health conditions that are caused by or associated with smoking.

Some people mistakenly switch from smoking cigarettes to using spit tobacco because they believe spit tobacco is not a harmful product since it is not burned.⁷

Table 2. Impact of smoking on mothers, fetuses, and infants¹⁹

Condition	Causal relationship	Evidence suggests a possible association
Sudden infant death syndrome (smoking during and after pregnancy)	√	
Maternal smoking during pregnancy and decreased lung function in infants	√	
Reduced fertility in women	√	
Premature rupture of the membranes, placenta previa, and placental abruption	√	
Risk for preeclampsia	√	
Preterm delivery and shortened gestation	√	
Fetal growth restriction and low birth weight	√	
Infant oral clefts		√
Ectopic pregnancy		√
Spontaneous abortion		√

Table 3. Smoking and oral health risks

Condition	Causal relationship	Association with increased risk	Other
Periodontal disease ¹⁹	√		
Cancer of the oral cavity, and pharynx ¹⁹	√		
Coronal dental caries ¹⁹			Inadequate evidence to infer relationship
Root surface caries ¹⁹			Suggestive but not sufficient to infer a causal relationship
Oral mucosal lesions, such as leukoplakia ¹⁹		√	
Delayed tissue healing with periodontal therapy, ^{26,27} including surgical, non-surgical and antimicrobial therapy ²⁸ and extractions	√		
Dental implant failure ²⁹		√	
Alveolar bone loss ²⁸		√ OR* 3 – light smoking OR 7.28 – heavy smoking	

* OR: Odds ratio

Cigars and pipes are also not safe alternatives to smoking cigarettes.

However, both general and oral health risks are associated with spit tobacco. There is some evidence that spit tobacco can lead to heart and blood vessel disease.^{12,19} As early as 1986, the Surgeon General concluded that spit tobacco “is not a safe substitute for smoking cigarettes,”²¹ and to date, there is no evidence that disputes this.

Cigars and pipes are also not safe alternatives to smoking cigarettes. Cigar and pipe smokers are exposed to the negative health effects of nicotine, regardless of whether or not they inhale. The mildly alkaline cigar smoke is absorbed more easily in the mouth than cigarette smoke.²² Smoking one cigar may produce the same negative health effects as smoking one package of cigarettes and the second-hand smoke is more harmful than of three cigarettes. Specific health risks associated with pipe and cigar smoking are as follows:¹⁹ a rate of laryngeal, oral, and esophageal cancer that is similar to that of cigarette smokers; a risk of developing lung cancer that is 2 to 3 times that of non-smokers; up to 3.6 times the risk of dying from chronic obstructive lung disease (emphysema) than non-smokers.

Non-smokers are also at risk for some of these health effects as a result of exposure to cigarette smoke. Environmental tobacco smoke (ETS) or second-hand smoke is a human lung carcinogen. Exposing children increases their risk of lower respiratory tract infections such as bronchitis and pneumonia, fluid in the middle ear, reduced lung function, worsened asthmatic condition, and new cases of asthma.²³ In addition, babies who were

exposed to ETS in the womb are at risk of sudden infant death syndrome.²⁴ There is no known safe level of exposure to ETS. The United States Environmental Protection Agency has declared it a Class A cancer-causing substance, which means that it is the most dangerous of cancer agents.²⁵

ORAL HEALTH RISKS

The detrimental effects of tobacco on oral health are well documented; some of these involve a high degree of risk. Table 3 outlines several types of relationships.

A number of studies examine the strength of the relationship between tobacco use and oral health risks. In Canada 3,000 cases of oral cancer are diagnosed each year and 75% of these cases are attributable to tobacco use.^{30,31} When variables such as oral hygiene, age, gender, systemic diseases, medication, and frequency of oral health visits are controlled, cigarette smoking is the most significant risk factor for periodontal disease.³² One study further defines this risk by indicating that smoking is associated with approximately one-half of the cases of periodontitis.³³ Three additional studies indicate that smokers have a two- to six-fold increased risk of developing periodontal disease compared with non-smokers³⁴⁻³⁶ and the risk of developing severe periodontal disease is three times greater for smokers.³⁷

Maternal tobacco use during pregnancy also has a negative impact on the fetus’ oral health. It is associated with intrauterine growth retardation that is harmful to the fetus’ and child’s oral and dental development. Oral developmental anomalies include cleft palate, dental asymmetry, and morphologic variants such as reduced tooth crown size.³⁸

Spit tobacco is not associated with generalized periodontal disease but does have a number of detrimental effects on oral health. It increases the risk of localized gingival recession and attachment loss as well as alveolar bone loss from constant irritation at the site where the tobacco is placed in the mouth. It also increases the risk of tooth abrasion from the grit and sand in the products plus increased tooth decay,³⁹ possibly due to the sugar that is added to the product.^{40,41}

Spit tobacco also increases the risk of cancers of the pharynx (throat), larynx (voice box), and esophagus as well as the risk of developing leukoplakia (mouth sores that can become cancerous), usually at the site where the dip is placed in the mouth.⁴² One study shows that spit tobacco users have a four-fold greater risk of developing oral cancer than non-users.⁴³ Stronger evidence is found in a meta-analysis of case-control studies showing an association between cancer of the oral cavity and other respiratory sites and smokeless tobacco and dry snuff. This meta-analysis indicates that dry snuff imposes the highest relative risk, ranging from 4 to 13 with smokeless tobacco (unspecified as to type) creating an intermediate risk of 1.5 to 2.8.⁴⁴

There is also some indication of an interaction between tobacco use and systemic disease, which creates further negative impact on oral health. For example, persons with diabetes are twice as likely to have periodontal attachment loss compared with non-diabetics. However, diabetics who smoke are 30 times more likely to have periodontal attachment loss than persons without these risk factors.³² This suggests that smoking interacts with systemic conditions to produce greater oral disease than either factor alone.

The biological mechanism whereby smoking impacts on periodontal disease requires further study and clarification. There is, however, some indication that it may include changes in the vasculature, the immune and inflammatory systems, tissue oxygenation, and the healing process.⁴⁵ Dental hygiene research has an important role to play in advancing the knowledge in this area.

THE ECONOMIC CONSEQUENCES OF TOBACCO USE

Tobacco use is a serious public health problem with heavy human, social, and economic costs. The following describes four studies that show the direct and indirect costs associated with smoking. Direct costs measure the value of resources or medical costs used as a consequence of smoking; indirect costs measure the value of productivity lost due to smoking-related illness, injury, or premature death. A 1992 study in Ontario found that the total direct and indirect costs associated with smoking were US\$2.91 billion. Similar results were found in a 1999 study in Louisiana: the total direct and indirect costs associated with smoking were 2.81 billion dollars or \$645 per capita. Direct costs totalled \$1,151 million with indirect costs were estimated at \$1,663 million.⁴⁶ Total annual U.S. direct and indirect costs have also been estimated at more than \$150 billion,⁴⁷ total annual U.S. medical care costs at \$50 billion.⁴⁸ These expenses are considerable and many

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could be prevented with increased tobacco cessation services.

The substantial costs associated with tobacco use can be reduced with tobacco cessation services. The costs in 1993 in the United States associated with physician-delivered brief advice and counselling about tobacco cessation are \$705 to \$988 per life-year gained for men and \$1,204 to \$2,058 for women.⁴⁸ A 1996 Canadian study found that it would cost \$67 per client to implement a school-based smoking cessation program. The benefit-cost ratio was determined to be 15.4 with annual net savings of \$619 million.⁴⁹ These studies demonstrate the cost effectiveness of tobacco cessation services. It is possible that if physician-delivered services obtain this high rate of return, services delivered by a dental hygienist would produce a similar or higher rate of return, due lower service costs. Given that dental hygienists currently deliver oral disease prevention programs and services in various settings, including schools, expanding these activities to include tobacco cessation has the potential for significant cost savings.

WHY DENTAL HYGIENISTS SHOULD PROVIDE TOBACCO USE CESSATION SERVICES

Dental hygiene practices have a combination of factors that create favourable conditions for the delivery of tobacco use cessation services (TCS). Not only do the majority of oral health clients expect dental hygienists to provide tobacco use cessation services,⁵⁰⁻⁵² but dental hygienists are also well suited to providing TCS. They have important skills in health promotion, disease prevention, health education, and behavioural motivation that would allow them to provide effective tobacco use cessation services. Moreover, dental hygienists serve some client populations that do not see other health professionals on a regular basis and that may therefore miss opportunities to receive tobacco use cessation advice. For example, men and teenagers generally make regular visits to oral health professionals; they are, however, less likely to see a physician.³⁴

In addition, contact with a client over an extended period of time, which may be common in dental hygiene practices, allows repeated reinforcement—essential for tobacco users who have a high tendency³⁷ to relapse. In fact, quitting a tobacco addiction is difficult and may take at least two or three attempts.^{53,54} Strong evidence also shows that treatment delivered by a variety of health professionals positively influences quit rates.⁵⁵ Therefore dental hygienists can confidently join other health professionals in providing encouragement and sending a consistent message that tobacco use is detrimental to health.

Dental hygienists can also contribute to the “denormalization” of smoking as an acceptable behaviour. The three

Dental hygienists have important skills in health promotion, disease prevention, health education, and behavioural motivation that would allow them to provide effective tobacco use cessation services.

main aspects of denormalization are the following: (1) dental hygienists can teach clients that due to the hazardous, addictive nature of tobacco, it is undesirable to use tobacco products; (2) they can promote tobacco use as socially unacceptable; (3) they can provide educational information about the tobacco industry's marketing techniques that link tobacco with popularity, attractiveness, and rebellion against conformity.

Although clients may be aware of the many health risks of tobacco use, they may be less familiar with the impact on oral health. The dental hygiene visit provides a unique venue where dental hygienists can discuss oral health effects of tobacco, relate oral changes to tobacco use, and deliver a tobacco use cessation message. Relating oral changes to tobacco use and providing visible evidence of the harm may provide clients with a powerful motivator for quitting tobacco use.

Since oral cancer screening is within the scope of practice of dental hygienists, it naturally follows that tobacco use cessation counselling should go hand in hand with this screening. The oral effects of smoking appear earlier than the systemic effects.³⁴ The dental hygienists can therefore be the first line of defence in detecting this negative impact on oral health. In the long term, helping clients to succeed in tobacco use cessation, preventing tobacco use, and conducting routine oral cancer screening has the potential to reduce health care costs, reduce premature morbidity and mortality rates associated with tobacco related diseases, minimize disfigurements and loss of function, and prevent systemic diseases from arising.

CURRENT INVOLVEMENT OF DENTAL HYGIENISTS IN TOBACCO USE CESSATION SERVICES (TCS)

There are numerous ways in which dental hygienists have incorporated tobacco use cessation into their practices. At the micro level, dental hygienists in public health are involved in tobacco use cessation services on a one-to-one basis, through group counselling, and by providing educational talks in schools and at health fairs.^{56,57} Dental hygienists who deliver private oral health services are also involved with tobacco use cessation services.

There is increasing recognition that dental hygienists have an opportunity and a professional responsibility to deliver TCS. In a recent survey by the Canadian Dental Hygienists Association (CDHA), 80% of dental hygienists disagreed strongly and disagreed somewhat with the statement, "It is not the role of a dental hygienist to counsel patients on smoking cessation."⁵⁸ Two other studies indicate similar attitudes of dental hygienists. Fried and

Rubinstein in 1990 surveyed 397 dental hygienists and 71% agreed that it is a dental hygienists responsibility to counsel smokers and smokeless tobacco users.⁵⁹ Gussy and others in 1996 surveyed dental hygienists and 60% felt it was appropriate for the dental hygienist to address smoking cessation with clients.⁶⁰ This research on attitudes shows that dental hygienists generally recognize that they have a professional responsibility to provide tobacco cessation services (TCS).

In keeping with this prevalent attitude, a number of dental hygiene professional associations support the provision of tobacco use cessation services by dental hygienists and are actively promoting these services. For example, CDHA⁶¹ and the Alberta Dental Hygienists Association^{62,63} provide TCS continuing education programs and support for oral health professionals to use TCS. At a macro level, dental hygienists and their professional associations across Canada also advocate for reduction in tobacco advertising, an increase in oral health professional education, and government tobacco reduction policies, such as smoke-free environmental policies. In addition, CDHA has been politically active in advocating for increased funding for dental hygiene smoking cessation services through the First Nations and Inuit Health Branch of Health Canada.⁶⁴ The goal is to address the staggering rates of tobacco use among Aboriginal peoples.

There are two ways in which dental hygiene professional associations provide support for the administrative aspects of providing TCS. First, the *CDHA National List of Dental Hygiene Services and System of Service Coding* includes a code for smoking cessation counselling. Second, suggested fees for TCS are listed in the provincial fee guides for British Columbia, Ontario, and Saskatchewan.

Although there may be a growing awareness about tobacco use cessation issues among dental hygienists, there is considerable evidence that oral health services do not commonly include tobacco use cessation services. Results from six studies of the nature and extent of TCS provided by dental hygienists in the United States, Canada, and the United Kingdom are shown in Table 4. It shows weaknesses in a number of service provision areas, including asking clients if they use tobacco, counselling in tobacco cessation, distributing relevant literature, referring to other tobacco cessation programs, and following up with clients. This gap in services is an opportunity lost, since dental hygienists could be contributing to improved oral and general health by collaborating with other health professionals in sending a consistent message about tobacco use.

Table 4 also shows a strong involvement of student clinics in the United States in tobacco cessation activities. The majority of these clinics advise clients to quit, distribute pamphlets, and discuss quit strategies. However, following graduation, dental hygienists become less involved in these activities. The weakest area is follow-up with clients who are interested in quitting smoking. Improvements in these activities may be obtained with effective TCS continuing education for dental hygienists. These studies highlight the need for further research to

Table 4. Tobacco cessation services provided by dental hygienists in the United States, Canada, and the United Kingdom

Researcher (location of study)	Question	Number of Respondents	Percentage of Respondents
Fried et al. 1990 ⁵⁹ (U.S.)	Almost always or often counselled smokers and smokeless tobacco users	397 dental hygienists	68%
	Distributed relevant literature	"	24%
	Almost always or often referred to cessation programs	"	14%
Hastreiter et al. 1997 ⁶⁵ (U.S.)	Advised smokers to quit	2,073 dental hygienists	54%
	Advised smokeless tobacco users to quit	"	74%
	Discussed specific strategies to stop tobacco use	"	24-25%
	Follow-up with clients	"	1%
Dolan et al. 1997 ⁶⁶ (U.S.)	Provide tobacco use cessation services	723 dental hygienists	32%
	Asked if the client smoked	"	25%
	Asked if the client used spit tobacco	"	9%
	Advised smokers to quit	"	60%
	Advised spit tobacco users to quit	"	84%
Gussy et al. 1996 ⁶⁰ (U.K.)	Routinely asked clients about smoking	N/A	30%
Brothwell et al. 2004 ⁶⁷ (Canada)	Mostly and routinely ask clients about tobacco-use status	31 dental hygienists	32%
	Mostly and routinely advise smokers of the health risk and need to quit	"	29%
	Mostly and routinely assist clients to quit	"	13%
	Follow-up with clients	"	0%
Barker et al. 1999 ⁶⁸ (U.S.)	Inquire about tobacco use	200 dental hygiene programs	100%
	Advise clients to quit	"	98.2%
	Give clients motivational pamphlets	"	84.5%
	Discuss cessation strategies with clients	"	76.5%
	Follow-up on tobacco cessation at subsequent appointments	"	53.2%

determine the extent of involvement of Canadian student clinics in providing tobacco cessation services.

DENTAL HYGIENISTS' INVOLVEMENT WITH ORAL CANCER SCREENINGS

Oral cancer screenings are an important aspect of tobacco cessation services, since smoking causes cancer of the oral cavity and spit tobacco use is associated with oral cancer. A routine oral examination by a dental hygienist provides an opportunity to see abnormal tissue changes and to detect oral cancer at an early curable stage.

Despite the benefits of such screening, there is some indication that dental hygienists perform this screening infrequently. A 1998 Canadian study shows that only 42.4% of dental hygienists provided oral cancer screenings at initial appointments for clients most at risk (≥ 40 years of age).⁶⁹ A slightly higher rate is reported in a U.S. study of 464 dental hygienists: while 100% of respondents indi-

cated the oral cancer examinations for adults 40 years of age or older should be provided annually, only 66% reported doing so on their initial appointment.⁷⁰

In addition, two surveys of the general population confirm that U.S. citizens frequently do not receive oral cancer screenings. The first study shows that only 8.7% of adults reported an oral cancer screening by a dentist or a dental hygienist,⁷¹ the second that fewer than 15% of the population receives an oral cancer screening by health professionals.⁷² This is an opportunity lost, since dental hygienists could be using the oral screening as a teachable moment to inform their clients about the risk factors and signs of oral cancer and to advise tobacco use cessation. These studies draw attention to a possible need for tobacco cessation continuing education programs with information on oral cancer risk factors and conducting oral cancer screenings.

DENTAL HYGIENE PRACTICES AS EFFECTIVE VENUES FOR THE PROVISION OF TOBACCO USE CESSATION SERVICES

There is sound evidence (see Table 5) that dental hygienists are effective in the provision of smoking and spit tobacco use cessation services. Three randomized controlled trials (RCTs) show positive results when dental hygienists provide smoking cessation services. In the United States, Secker-Walker et al. in 1988⁷³ reported a 14.6% quit rate in a pilot study with dental hygienists providing smoking cessation services. In England, a randomized controlled trial with dental hygienists providing smoking cessation services showed a quit rate ranging from 13% to 16.9%, compared with the control group with a 5% to 7.7% quit rate.⁷⁴ These services also resulted in an 80% smoking reduction rate compared with 24% in the control group. These level 1 studies confirm that dental hygienists are achieving quit rates for smoking cessation that range from a low of 2.5% to a high of 14.6%.

Only one study reported a non-significant quit rate with intervention.⁷⁵ Although the researcher suggests a number of reasons for this, the most convincing rationale was that the type of intervention may be more effective for smokeless tobacco users who might have more visible signs of the effects of tobacco use on their oral health.

The five randomized controlled trials in Table 5 show positive results when dental hygienists implement spit tobacco use cessation services. In summary, the quit rates for the clients who received dental hygiene tobacco use cessation services ranged from 10.2% to 35% compared with the control group's quit rates of 3.3% to 21%.⁷⁵⁻⁷⁹ Similar positive results were found in a spit tobacco study with no control; dental hygienists obtained a 19% quit rate.⁸⁰

Dental hygienists are effective in the provision of smoking and spit tobacco use cessation services.

Although these are important, primarily level I studies showing dental hygienists are successful in changing clients' tobacco use behaviour, some aspects of the studies' methodologies limit the significance of the results. Most of the studies may be limited by their method of measuring the outcome. Macgregor (1996), Stevens et al. (1995), Secker-Walker (1988), Severson et al. (1998), Greene et al. (1994), and Little et al. (1992) used self-reporting of quit status to measure the outcome. This method is limited by the lack of biochemical validation of reported smoking cessation. Walsh et al. (1999) used self-reporting with a pipeline procedure—they informed subjects that biochemical assessments would be used to assess tobacco use status while actually most would be collected but not evaluated. Walsh et al. (2003) determined tobacco use status with a biochemical assays of saliva and self-reporting. The saliva test is limited due to the 20-hour half-life of cotinine. (Cotinine is a metabolite of nicotine and the most widely used biochemical marker of tobacco use.) This method

does not allow validation of quitting for more than 20 hours.

There is also some difficulty in comparing the RCTs due to the way in which subjects were assigned to the control and intervention groups. Although the control subjects in the smoking studies were randomly assigned to both control and intervention groups, there was one difference in the way in which the intervention subjects were assigned. In Macgregor (1996), intervention subjects specifically expressed a wish to reduce or cease smoking. Secker-Walker et al. (1988) did not screen subjects in this way. The screening-in of committed subjects may increase the quit rate and this information should therefore be taken into account when comparing the two studies. Also, the Secker-Walker study is limited by the lack of a control group.

FACTORS AFFECTING DENTAL HYGIENISTS' PROVISION OF TOBACCO USE CESSATION SERVICES

A number of factors influence a dental hygienist's decision to provide tobacco use cessation services (TCS). International studies show that a lack of training may be one factor that prevents some dental hygienists from providing TCS. A recent CDHA survey confirmed this, showing that 44% of dental hygienists believed they were not knowledgeable enough about smoking cessation to counsel clients on this topic.⁵⁸ A study in England also indicated that dental hygienists do not provide TCS since they do not have sufficient training or enough materials to advise clients.⁵¹ Similar results were found in two U.S. studies. The first indicates that 23% of dental hygienists had completed formal TCS training but that only 17% felt they were well prepared to assist clients with TCS.⁶⁶ The second indicates that 30% of dental hygienists believed themselves adequately prepared to counsel smokers and smokeless tobacco users.⁵⁹ Dental hygienists' perceived lack of knowledge about tobacco cessation may be the leading factor in this service provision gap.

Some solutions to address this service gap may include increased availability of effective tobacco cessation continuing education (CE) programs, and integrated didactic and clinical education in tobacco use cessation services at dental hygiene schools. Narrowing the gap in services through increased education may be relatively simple, for two reasons. First, 89% of dental hygienists are interested in learning more about smoking cessation;⁵⁸ they therefore may readily enrol in CE programs. Second, a review of RCTs that examine the training of health care professionals in smoking cessation interventions⁸¹ shows that training had a measurable effect on delivery of interventions.

Other factors influence the dental hygienist's decision to provide TCS. Dental hygienists may be deterred by an inability to obtain cost reimbursement from dental insurance. However, a significant portion of oral health services is paid for out-of-pocket; therefore the client may be charged directly for tobacco cessation services. The extent to which clients would be prepared to pay for these services has yet to be determined. The dental hygienist-client

Table 5. Efficacy of tobacco cessation services provided by dental hygienists

Researchers	Type of service/ Number of subjects	Quit Rate		Reduction Rate		Randomized controlled trial (RCT)
		Tobacco use cessation services	Control	Tobacco use cessation services	Control	
Smoking cessation services						
Macgregor 1996 ⁷⁴	Brief 4-6 minutes of advice 98 intervention/38 control dental hospital clients	13.3%	5.3%	80%	29%	Yes
Secker-Walker et al. 1988 ⁷³	Brief counselling; printed materials, and reminder postcards 51 private dental clinic clients	14.6%				No
Severson et al. 1998 ⁷⁵	Extended intervention: brief counselling, video and follow-up call 1,374 private dental clinic clients	2.5%				Yes
Spit tobacco cessation services						
Severson et al. 1998 ⁷⁵	Extended intervention: brief counselling, video and follow-up call 633 private dental clinic clients	10.2%	3.3%			Yes
Stevens et al. 1995 ⁷⁶	Brief advice, self-help booklet and kit, video, follow-up call 245 intervention/ 273 control/ 58 pre-intervention* clinic clients	18.4%	12.4%			Yes
Walsh et al. 1999 ⁷⁷	Brief intervention by dentist; self-help guide; 15 to 20 minutes of counselling; a follow-up call 171 intervention/ 189 control baseball and football team members	35%	16%			Yes
Walsh et al. 2003 ⁷⁸	Oral cancer screening exam; peer-led component (video and slides); brief counselling by dhs; self-help guide; 15-minute small group session; follow-up call 516 intervention /568 control baseball athletes	27%	14%			Yes
Little et al. 1992 ⁷⁹	Brief intervention; videotape; self-help manual; quit kit; and follow-up call 518 male dental HMO clients	32%	21%			Yes
Greene et al. 1994 ⁸⁰	Advice to quit and extended intervention; behavioural counselling 128 major league baseball players	19%				No

* Pre-intervention subjects received usual care for the first 6 months and then tobacco cessation intervention for the remainder of the project.

44% of dental hygienists believed they were not knowledgeable enough about smoking cessation to counsel clients on this topic.

relationship may also be a consideration. Some dental hygienists may be concerned that raising this issue may alienate or offend their clients and some of their younger clients may feel embarrassed discussing this topic.⁸² However, this concern may be unwarranted, since as stated earlier in the paper, many clients expect dental hygienists to provide this service.

The service delivery time factor may also be a concern, since there may be a need to work efficiently to achieve a high ratio between billable and non-billable hours. There are two ways in which to minimize the amount of time for delivery of TCS. First, as discussed in the next section, brief tobacco use cessation services do not have to take more than three minutes. Second, TCSs can be incorporated directly into the routine of client services. Tobacco use can be one item on a list of causal factors for poor oral health and can be discussed along with other issues such as high sugar intake and uncontrolled diabetes.

BRIEF AND INTENSIVE TOBACCO CESSATION INTERVENTIONS

The United States Public Health Service developed a tobacco use and dependence clinical practice guideline that suggests that counselling and behaviour therapy, including brief and intensive counselling, should be employed with all clients who are using tobacco.⁸³ Brief clinical interventions are three-minute interventions, incorporating the “Five A’s” (described below). This intervention has five major steps: ask, advise, assess, assist, and arrange. The dental hygiene clinical setting may be well suited to the brief intervention rather than more intensive counselling, since TCSs are only one of a number of other oral health services delivered by a dental hygienist in a limited amount of time.

The Five A approach is also recommended by a number of other health organizations including the United States National Cancer Institute and the U.S. Agency for Health Care Policy and Research (AHCPR).⁸⁴ The approach is recommended in Ontario under the Clinical Tobacco Intervention Program, under the Ontario Medical Association, the Ontario Pharmacists’ Association, and the Ontario Dental Association. For additional information on the “Five A’s,” visit the following website: www.ncbi.nlm.nih.gov/books/bv.fcgi?call=bv.View..ShowSection&rid=hsat2.section.7741.

The Five A’s⁸³

1. **Ask:** Determine tobacco use status and flag the chart of those who are actively using tobacco, to prompt future discussions. Systematic identification and tracking of tobacco using clients is an essential first step.

2. **Advise:** Advice should be clear, strong, and personalized.
 - Minimal – The following is an example of one way in which to give advice: “As an oral health professional, I must advise you that tobacco use is detrimental to your oral and overall health and I urge you to stop using tobacco products. I can help you to quit.”
 - The following is another example of how to provide advice: “As your dental hygienist, I must tell you that the best thing you can do to protect the health of your teeth and gums is to quite smoking. Of course, this will also have a positive impact on your general health.”
 - Advise the client of their current oral condition, which may be related to tobacco use and teach them how to detect possible future signs or symptoms that they should be looking for.
 - Augmented – educate the client regarding the health benefits of tobacco use cessation.
3. **Assess:**
 - Minimal – ask if client is interested in quitting.
 - Augmented – assess smoking history and patterns.
4. **Assist** client to stop:
 - Minimal – provide self-help materials.
 - Augmented – provide client-centred counselling; offer support and recommend first- or second-line pharmacotherapies
5. **Arrange** a referral.
 - Minimal – to prevent relapse, arrange for a follow up visit or contact by phone, or provide a referral to a tobacco use cessation program/counsellor/phone line. Follow up and referral can be arranged according to the different stages of change discussed below.
 - Augmented – to prevent relapse, arrange quit date and follow up appointments.

Two other integral aspects of the Five A approach include determining the client’s level of addiction and willingness to quit. Level of addiction can be assessed using a simple or more complex method. A simple method may include a tally of the number of cigarettes per day: mild addiction is 1-5 cigarettes per day; moderate addiction, up to 10 cigarettes per day; severe addiction, up to 20 or more cigarettes per day. This may not be as accurate as a more complex method of assessment. A complex method, such as the Fagerström test,⁸⁶ consists of questions about the timing of the first cigarette of the day, previous history of withdrawal, and ability to resist the urge when smoking is prohibited.

A willingness to quit can be assessed with a variety of techniques. Prochaska’s transtheoretical model of change is a comprehensive method for assessing willingness to quit. It includes the following concept of stages of “change readiness” or willingness to quit:^{87,88}

- Precontemplation – clients who are not ready to quit in the next six months. Remind client that services are available when they are ready to use them.
- Contemplation – clients who are ready to stop in the next six months, who have not attempted to stop in the last year. Offer them self-help material, refer

them to other health professionals and an opportunity to discuss plans to quit, assistance planning or setting a quit date.

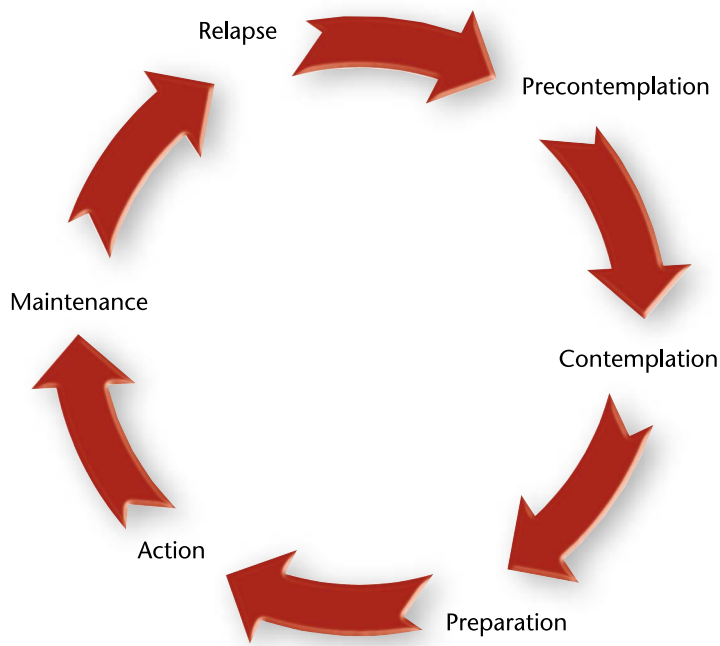
- Preparation – clients who are ready to quit in the next month, who have made an attempt in the last year. Offer them self-help material, refer them to other health professionals and an opportunity to discuss plans to quit, assistance planning or setting a quit date.
- Action – clients who are making a quit attempt. They can be provided with encouragement and information about relapse.
- Maintenance – clients who are maintaining their quit attempts. They can be provided with encouragement and information about relapse.

Individuals cycle through these stages and a relapse may be followed by beginning again at the precontemplation stage. The cycle through the stages above may be repeated at least two to three times. The concept of “decisional balance” includes an understanding of the reasons to smoke including pleasure, tension relief, and concentration, and the benefits of quitting including health, embarrassment to smoke, and social pressures to quit. Having self-insight into these reasons allows a person to strengthen the reasons to quit and to find other ways to meet the needs that stimulate their smoking.

The applicability of the central concepts of the transtheoretical model are currently being studied with adolescents.⁸⁹ Early findings suggest that adolescents and adults exhibit similar behaviour at different stages of the smoking cessation process. Adolescents, however, may progress through the stages very quickly and enter the action stage prematurely, which makes them poorly prepared for cessation. This may indicate that youth could benefit from a heavier emphasis on the first two stages of change.

RESEARCH EVIDENCE ON TOBACCO USE CESSATION INTERVENTIONS

An evidence-based approach to providing TCS includes an examination of research on different types of tobacco use cessation interventions. The findings from this research can assist in referring clients to appropriate, effective tobacco cessation services. This section provides research evidence on a number of approaches including, brief and intensive clinical intervention, self-help programs, telephone hotlines, quit smoking contests, community programs, exercise, hypnotherapy, and acupuncture.



Prochaska's Transtheoretical Model

Cycle may be repeated at least 2 to 3 times

Three reviews of randomized controlled trials on brief and more intensive clinical intervention show they are an effective method for delivering tobacco use cessation services. The first review found that intensive advice was no more effective than brief counselling.⁹⁰ The second review, of 31 randomized controlled trials examining physicians' smoking cessation advice,⁹¹ found that brief intervention has a small effect on smoking cessation (odds ratio 1.69, 95% confidence interval 1.45 to 1.98) when brief intervention is compared with no advice or usual care. The review also found that more intensive interventions are marginally more effective than brief interventions (odds ratio 1.44, 95% confidence interval 1.23 to 1.68). The third review of 29 studies shows that clients who received brief tobacco use cessation services from a non-physician or a physician were twice as likely to quit their tobacco use compared with clients who received no TCS.⁵⁵

Although most of the studies do not generally examine the interactions and synergies across these intervention elements, there is some evidence that combining pharmacotherapy and counselling produces better quit rates than either treatment alone.⁵⁵



Breaking the Cycle

Self-help may be described as structured programming or informational material that encourages tobacco use cessation without intensive contact with a therapist. A systematic review of randomized clinical trials of self-help materials⁹² showed that they may increase quit rates compared with no intervention, but the effect is small. This review also showed that self-help materials tailored to the individual as opposed to standard self-help materials are more effective when used alongside other interventions such as advice from a health care professional or nicotine replacement therapy. A randomized clinical trial on the efficacy of computerized self-help material based on the transtheoretical model of change (TMC) found quit rates of 17% to 21%.⁸⁷ The 756 volunteers were randomly assigned to one of four different types of self-help interventions. The study also showed that successful smoking cessation took place over an 18-month period of time.

Telephone hotlines can provide information and support to individuals who are trying to quit smoking or who are considering quitting. A systematic review of 23 randomized or quasi-randomized controlled clinical trials⁹³ found that proactive telephone counselling increases quit rates by 1 and a half times compared with less intensive intervention without personal contact (OR 1.56, 1.38 - 1.77).

Over the past three years, more than 35,000 smokers have entered an Ontario province-wide quit smoking contest. An evaluation of this program shows that 31% of the participants were smoke-free one year after the contest.⁹⁴

Community intervention programs and social marketing use multiple channels to provide reinforcement, norms, and support for not smoking. A review of 32 controlled trials of community intervention in tobacco use showed that the net decline in tobacco use ranged from -1% to 3% in men and women.⁹⁵ The largest and best conducted studies failed to show an effect on the prevalence of smoking.

There is some evidence that combining pharmacotherapy and counselling produces better quit rates than either treatment alone.

Exercise may assist people to quit smoking, since it may moderate the effects of nicotine withdrawal. A review of eight randomized controlled trials,⁹⁶ comparing exercise programs as an adjunct to cessation programs and cessation programs alone, shows that one of the eight trials indicated a significant benefit from an exercise program. However, the other seven randomized controlled trials were too small to conclude that the results were reliable. Therefore further research is required in this area.

Hypnotherapy is thought to assist with smoking cessation by working on the underlying impulses to weaken the desire to smoke and/or increase the desire to stop smoking. However, a review of randomized controlled trials⁹⁷ shows that hypnotherapy is not an efficacious treatment, as it does not have a greater effect on quit rates than no inter-

vention or other interventions. A second review of 59 studies indicates similar results.⁹⁸

A systematic review of randomized controlled clinical trials⁹⁹ shows that there is no clear evidence that acupuncture, acupressure, laser therapy, or electrostimulation are effective in smoking cessation. More research is needed in this area.

PHARMACOTHERAPY

Numerous effective pharmacotherapies now exist for treating smoking addiction, as an adjunct to counselling. These therapies are divided into two categories, first-line and second-line.¹⁰⁰ First-line pharmacotherapies such as nicotine replacement therapy and the anti-depressant sustained release (SR) bupropion should be recommended initially, as there is substantial evidence of their efficacy and there are fewer side effects than the second-line pharmacotherapies. Second-line pharmacotherapies include clonidine and nortriptyline. Other medications used to treat tobacco addiction include other anti-depressants, anxiolytics, mecamlamine, and silver acetate. "At least one of the first or second line medications should be used with all clients attempting to quit smoking, except in the presence of contraindications."⁵⁵ For further details on pharmacotherapies, please see Appendix A. The U.S. Department of Health and Human Services has a very useful chart that includes a list of pharmacotherapies for smoking cessation, contraindications, side effects, dosage, duration, availability, and cost per day. This can be found at <www.surgeongeneral.gov/tobacco/clinicaluse.pdf>.

CONCLUSIONS

There is compelling evidence that tobacco use has a devastating effect on general health and a significant negative impact on oral health. There is also clear evidence that dental hygienists can successfully assist individuals to quit tobacco use. In addition, the majority of oral health clients expect dental hygienists to provide TCS. When these three pieces of information on health impact, efficacy of dental hygiene service provision, and public expectations are considered together, the logical conclusion is that dental hygienists must play an important role in tobacco cessation. However, both cancer screening and tobacco use cessation services are underutilized by dental hygienists. Thus there is a wide opportunity for change in this area. Dental hygienists can provide these services in numerous practice settings, where they are in uniquely effective settings to potentially reduce the morbidity and mortality of tobacco-related disease.

In the best interests of the public, the dental hygienist should become a member of the inter-disciplinary team that is currently addressing tobacco use. Dental hygienists can collaborate with a variety of other health professionals in delivering a consistent message about tobacco cessation. This will strengthen the health system capacity for tobacco reduction. The future role of dental hygienists in tobacco use cessation is very clear. It is time to make tobacco use cessation and prevention services an integral part of oral health services.

APPENDIX A. PHARMACOTHERAPY

Nicotine Replacement Therapy

Nicotine replacement therapy (NRT) is the most widely used pharmacotherapy for treating tobacco addiction.¹⁰¹ NRT replaces nicotine from tobacco, reducing nicotine withdrawal symptoms and the urge to smoke thus making it easier to quit smoking. NRT is available in Canada in both prescription and non-prescription form. The non-prescription NRT is available in as a transdermal patch, chewing gum, and an oral inhaler. The prescription NRT is available in lozenge form. Health Canada is currently consulting the public regarding their proposal to make the NRT lozenge, with 4 mg or less of nicotine, available in non-prescription form. In several other countries, nasal spray and tablets are also available.

A review of 108 randomized controlled trials¹⁰² found that all forms of commercially available NRT are effective for smoking cessation and that they increase quit rates by 1.5- to 2-fold, independent of the additional support provided to the client. A consensus statement published by the World Health Organization recommends that NRT should be recommended to smokers with stable cardiovascular disease who have tried to quit and failed without such help.¹⁷ This consensus statement also suggests that regulators change the wording on the NRT labels to allow smokers to continue use after the recommended treatment period if they feel that it would result in long-term tobacco use cessation, since the potential risks of long-term use are far less than the risks of smoking. The Ontario Medical Association position statement on smoking cessation medications is in keeping with these two recommendations. This document states that “nicotine patch and gum should be used for as long as needed to maintain or prolong tobacco abstinence” and “given the seriousness of their medical condition, cardiac patients who cannot quit should be among those first considered for NRT.”¹⁰³

There is some evidence that pharmacotherapy agents have not been proven successful for spit tobacco users¹⁰⁴ and there are mixed reviews on the use of NRT this type of tobacco use. Specifically, studies with nicotine gum and nicotine patch found a lack of efficacy.¹⁰⁵ In addition, a review of randomized controlled trials on nicotine replacement therapy found a very low impact on spit tobacco use, with an odds ratio of 1.3; 95% CI, 1.0-1.6.¹⁰⁶ More research is needed in this area.

Antidepressants (Non-Nicotine Agents) and Anxiolytics

There are two possible reasons why anxiolytics and antidepressants may help in smoking cessation. First, anxiety and depression may be a symptom of nicotine withdrawal and these drugs help to reduce these symptoms. However, there is some evidence that the efficacy of bupropion is not due to its anti-depressant effects.¹⁰⁷ Second, smoking may be due to deficits in norepinephrine, dopamine, and serotonin, all of which are increased by anxiolytics and antidepressants.

Some common antidepressant drugs include bupropion (marketed as Zyban for smoking cessation), doxepin, fluoxetine, imipramine, moclobemide, nortriptyline, selegiline, sertraline, tryptophan, and venlafaxine. A systematic review of eight randomized controlled trials¹⁰⁸ found that the antidepressants bupropion and nortriptyline can aid in smoking cessation; however, nortriptyline has more side effects than bupropion.³⁷ There is also some preliminary evidence from one randomized clinical trial that bupropion is more effective than nicotine replacement therapy (NRT), either alone or in combination with NRT.¹⁰² The combination of the two drugs, bupropion and NRT, increases effectiveness. However, the initial “quit rate” is usually less than 50%.¹⁰⁹

A meta-analysis of randomized controlled trials using bupropion sustained-release (SR) to treat spit tobacco use showed an odds ratio of 2.1; 95% confidence interval (CI), 1.0-4.2.¹⁰⁶

The following are some examples of anxiolytics: buspirone, diazepam, doxepin, meprobamate, ondansetron, and beta-blockers such as metoprolol, oxprenolol, and propranolol. A systematic review of six randomized controlled clinical trials¹¹⁰ using anxiolytics showed that there is no consistent evidence that anxiolytics aid in smoking cessation, but the evidence does not rule out a possible effect. More research is needed in this area.

Mecamylamine

Mecamylamine is a nicotine antagonist that works by blocking the rewarding effect of nicotine and reducing the urge to smoke. A systematic review of two randomized controlled trials¹¹¹ that looked at the effects of mecamylamine on smoking cessation found that nicotine patch combined with mecamylamine is more effective than nicotine patch alone. However, the studies were small and further research is needed before a clinical protocol is recommended.

Clonidine

Clonidine was initially used to lower blood pressure and there is some evidence that it may decrease withdrawal symptoms in clients with multiple drug addictions who also use tobacco; however, important side effects limit its usefulness.¹¹² It is considered a second-line pharmacotherapy for tobacco use.

Silver Acetate

Silver acetate produces an aversion stimulus, since it produces an unpleasant taste when combined with smoking. Commercially available silver acetate comes in gum, lozenge, and spray form. A systematic review of randomized controlled trials¹¹³ studying the effects of silver acetate concludes that it has little effect on smoking cessation (odds ratio 1.05, 95% confidence interval 0.63 to 1.73).

APPENDIX B. RESOURCES

- Action on Smoking and Health – This UK public health charity aims to “achieve a sharp reduction and eventual elimination of the health problems caused by tobacco.” Its website offers data and fact sheets on tobacco’s effects on body systems; tobacco’s impact on less-developed countries; environmental smoke and tobacco in the workplace; and insights into the economics of smoking. The “quitting smoking” section has a fact sheet on nicotine and addiction, tips for quitting and what to expect in the process, e-mail counseling, case studies of successful quitters, and links to smoking-cessation sites.
www.ash.org.uk
- Alberta Alcohol and Drug Abuse Commission
www.zoot2.com/justthefacts/tobacco/who_smokes.asp
- Allen Carr’s Easy Way to Stop Smoking
www.allencarreasyway.ca
- America Lung Association
www.lungusa.org/tobacco/index.html
- American Academy of Periodontology
www.perio.org/consumer/stop-smoking.htm
- B.C. Cancer Agency, Clinical Tobacco Intervention for Dental Hygienists
www.bccancer.bc.ca/HPI/CME/CTIRP/Dental+Hygienists/Readings/clinical+tobacco+intervention.htm
- BC Doctors’ Stop-Smoking Program. Free clinical tobacco intervention kits for health professionals, including chart labels and a host of other material.
www.bcdssp.com/
- California Dental Association – Smokeless tobacco
www.cda.org/public/cch5fs.html
- Campaign for Tobacco Free Kids
<http://tobaccofreekids.org/>
- Canadian Cancer Society
www.cancer.ca/ccs/internet/cancer/0,,3172,00.html
Toll-free cancer information service (1-888-939-3333)
- Canadian Cancer Statistics
www.cancer.ca/ccs/internet/standard/0,,3543_12851__langId-en,00.html
- Canadian Lung Association
www.lung.ca
- Centres for Disease Control and Prevention, Office on Smoking and Health, Tobacco Prevention and Information Source (TIPS)
www.cdc.gov/tobacco/
- The dental hygienist’s role in tobacco use prevention and cessation [audiocassette + study guide] / Fried, Jacquelyn L. – Chicago, IL: American Dental Hygienists’ Association, 1995. Available from the CDHA library – WM 290 F75 1995
- Getting Rid of An Old Flame: A tobacco use cessation program for the dental team. Available from the CDHA library
- Health Canada
www.hc-sc.gc.ca/hecs-sesc/tobacco/
- Health Canada: Canadian Tobacco Use Monitoring Survey
www.hc-sc.gc.ca/hecs-sesc/tobacco/research/ctums/index.html#cha
- Health Canada: Quitting – Health Canada offers a clear and concise set of resources to help people quit smoking, including a motivational step-by-step guide, *On the Road to Quitting* (html and pdf formats) and two months of free, supportive e-mails. Also of interest: the “5 stages of quitting”; information on nicotine replacement and medication; and the story of Bob, a fictional character with whom smokers can identify as they embark on smoking cessation.
www.hc-sc.gc.ca/hecs-sesc/tobacco/quitting/
- Health Canada: Go Smoke Free Resources for professionals and the public.
www.hc-sc.gc.ca/hecs-sesc/tobacco/
- Health Canada: Tobacco National Strategy, 1999
www.hc-sc.gc.ca/hecs-sesc/tobacco/policy/new_directions/
- Health Canada: The National Strategy: Moving Forward, 2003 Program Report on Tobacco Control
www.hc-sc.gc.ca/hecs-sesc/tobacco/policy/prog03/Tobacco-e3.pdf
- Health Consequences of Spit Tobacco
http://tobacco.aadac.com/about_tobacco/tobacco_research/tbh_5.pdf
- Heart and Stroke Foundation of Canada,
ww2.heartandstroke.ca/Page.asp?PageID=24
- Helping Smokers Change: A resource pack for training health professionals
<http://www.euro.who.int/document/e73085.pdf>
World Health Organization publication, 2001
- How to Quit
Use full resources to quit smoking
www.cdc.gov/tobacco/how2quit.htm
- The Master Anti-Smoking Page
www.autonomy.com/smoke.htm
- National Cancer Institute – assistance for smokers
www.smokefree.gov
- National Cancer Institute – Prevention and cessation of cigarette smoking: Control of tobacco use (for clients)
www.nci.nih.gov/cancerinfo/pdq/prevention/control-of-tobacco-use/patient
- National Clearing Housing on Tobacco and Health Program: includes National Non-Smoking Week Activities, and a list of Smokers Help Lines which are found in Alberta, British Columbia, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, Saskatchewan, and Newfoundland and Labrador.
www.ncth.ca/NCTH_new.nsf
- No Smoke Software
www.smokefreekids.com/smoke.htm
- Ontario Quit Smoking 2004 Contest
www.quitsmokingontario.ca

- Oral Cancer Screening: A brief review. This 11-minute video can be borrowed from the Alberta Dental Hygienists Association
www.adha.ca
- Oral Health America has a CD Rom entitled "A Hygienist's Guide to Oral Health, Tobacco and Patient Care." E-mail: Samantha@oralhealthamerica.org. Tel: 312-836-9900. Mail: Samantha Niesen, Oral Health America, 410 N. Michigan Avenue, Suite 352, Chicago, IL 60611. Public Health Service guidelines on "Treating Tobacco Use and Dependence."
www.surgeongeneral.gov/tobacco/
- QuitNet – Operated in association with Boston University's School of Public Health, QuitNet offers a complete on-line program for quitting smoking with three levels of support (one free of charge and two fee-based). Included in the free program are on-line forums, tips and tools, chats with experts, and a medication guide.
www.quitnet.com
- Smoking cessation courses are available through: local health units as well as through universities as continuing education courses.
- Smoking from All Sides
<http://smokingsides.com/>
- Tobacco BBS – tobacco news and information
www.tobacco.org
- Tobacco Cessation Guideline, U.S. Department of Health and Human Services, Treating Tobacco Use and Dependence - clinicians package and You can quit smoking - consumer kit.
www.surgeongeneral.gov/tobacco/default.htm
- Tobacco Control Archives
<http://galen.library.ucsf.edu/tobacco/>
- Tobacco Control for the Dental Hygienist – Tobacco Cessation/Prevention Resource Site for Dental Hygiene Faculty
www.siu.edu/~hcp/tobacco/
- Tobacco Control Online
<http://tc.bmjournals.com/>
- TobaccoControl.org – Tobacco Control Online
www.tobaccocontrol.org/
- Tobacco Control Resource Center, Inc. & The Tobacco Products Liability Project – In addition to useful information, see Graham Kelder's two recent and important articles: An analysis of Judge Osteen's ruling on the EPA report and a close look at the Fourth Circuit's ruling on the FDA's tobacco regulations.
www.tobacco.neu.edu/
- Treatobacco.net - Database & Educational Resource for Treatment of Tobacco Dependence
<http://treatobacco.net/home/home.cfm>
- Trytostop.org
<http://trytostop.org/>
- US Surgeon General: Tobacco Cessation Guideline – This site features a clinician's "packet" for treating tobacco use and dependence; it provides strategies for dealing with all levels of clients (those willing to quit, those on the fence, and those who refuse) a quick screening method for tobacco use status, guidelines for smoking cessation pharmacotherapy, and a wide range of client-education materials.
www.surgeongeneral.gov/tobacco/
- University of Pittsburg
The university has two particularly relevant resources. First, a free 11-minute video entitled "Oral Cancer Screening: A Brief Review." Second, copies of the JADA special supplement from November 2001 on "Combating Oral Cancer." E-mail: mmkst56@pitt.edu
Website: www.upmccancercenters.com/oral Tel: 412-647-2111 Mail: Margaret Kuder Hamilton, University of Pittsburgh Oral Cancer Center, School of Dental Medicine, 200 Lothrop Street, Suite 500, Pittsburgh, Pennsylvania 15213.
- You and Me Smoke Free – web site for youth
www.hc-sc.gc.ca/hecs-sesc/tobacco/youth/index.html
- World Health Organization.
www.who.int/health_topics/smoking/en/

ENDNOTES

1. Health Canada. Canadian tobacco use monitoring survey: summary of results for 2003 [on-line]. Ottawa: Health Canada; 2003 [cited 2004 Feb 2]. Available from: http://www.hc-sc.gc.ca/hecs-sesc/tobacco/research/ctums/2003/summary_first_s003.html.
2. Alberta Alcohol and Drug Abuse Commission. Just the facts: who smokes? [on-line]. Edmonton: AADAC [cited 2004 May 19]. Available from: http://www.zoot2.com/justthefacts/tobacco/who_smokes.asp
3. Health Canada. A second diagnostic on the health of First Nations and Inuit People in Canada [on-line]. Ottawa: Health Canada; 1999 [cited October 2004]. Available from: http://www.hc-sc.gc.ca/fnihb-dgspni/fnihb/cp/publications/second_diagnostic_fni.htm
4. Statistics Canada and Canadian Institute for Health Information. Health Reports – Supplement. How healthy are Canadians? Annual Report 2002. Ottawa: Statistics Canada; 2003.
5. Alberta Alcohol and Drug Abuse Commission (AADAC). Smoking rates [on-line]. Edmonton: AADAC [cited 2004 Jul 8]. Available from: http://tobacco.aadac.com/about_smoking/smoking_rates/.
6. Health Canada. Canadian tobacco use monitoring survey: summary of results for 2003 (February to December) [on-line]. Ottawa: Health Canada; 2004 [cited 2004 Feb 2]. Available from: <http://www.hc-sc.gc.ca/hecs-sesc/tobacco/research/ctums/>
7. Darby M, Walsh M. Dental hygiene theory and practice. 2nd ed. Toronto: W.B. Saunders; 2003.
8. Benowitz NL, Porchet H, Jacob P. Pharmacokinetics, metabolism and pharmacodynamics of nicotine. In: Wonnacott S, Russell MAH, Stolerman IP, editors. Nicotine psychopharmacology: molecular, cellular, and behavioural aspects. Oxford: Oxford University Press; 1990. p. 112-157.
9. Health Canada. Canadian tobacco use monitoring survey, Wave 1, February–June 1999 [on-line]. Ottawa: Health Canada; 2000 [cited 2004 Aug 2]. Available from: <http://www.hc-sc.gc.ca/hpb/lcdc/bc/ctums/pdf/ctums99.pdf>.
10. Alberta Alcohol and Drug Abuse Commission (AADAC). The Alberta youth experience survey 2002. Summary report. Edmonton: AADAC; 2003.
11. Gansky S, Ellison JA, Kavanagh C, Hilton JF, Walsh MM. Oral screening and brief spit tobacco cessation counseling: a review and findings. *J Dent Educ.* 2002;66(9):1088-98.
12. Benowitz NL. Pharmacology of smokeless tobacco use: nicotine addiction and nicotine-related health consequences. Chapter 4 in: *Smokeless tobacco or health: an international perspective. Smoking and Tobacco Control Monograph 2.* Atlanta (GA): National Institutes of Health, US Department of Health and Human Services; 1992.
13. Abernathy TJ, Bertrand LD. The prevalence of smokeless tobacco and cigarette use among sixth, seventh and eighth grade students: a longitudinal investigation. *Can J Public Health.* 1992;83(1):15-18.
14. Henningfield JE, Benowitz NL, Connolly GN, Davis RM, Gray N, Myers ML, Zeller M. Reducing tobacco addiction through tobacco product regulation. *Tob Control.* 2004;13(2):132-5.
15. Health Canada. Canadian tobacco use monitoring survey. Trends in smoking in 1999. Ottawa: Health Canada; 1999.
16. Arehart-Treichel J. Smoking and mental illness: which one's the chicken? *Psych News.* 2003;38(19):34 [cited 2004 Aug 11]. Available from: <http://pn.psychiatryonline.org/cgi/content/full/38/19/34>.
17. World Health Organization. Regulation of nicotine replacement therapies: an expert consensus. Copenhagen: WHO; 2001.
18. Health Canada. Resources for professionals: Tobacco and young people – facts, forces, and trends." Chapter 5 in: *Improving the odds: educator's Resource* [on-line]. Ottawa: Health Canada; 2002 [cited 2004 Jul 26]. Available from: http://www.hc-sc.gc.ca/hecs-sesc/tobacco/prof/youth/odds/odds023_c5.html.
19. U.S. Department of Health and Human Services. Public Health Service. The health consequences of smoking. A Report of the Surgeon General. Centers of Disease Control [on-line]. [n.p.]: PHS; May 2004 [cited 2004 Jul 8]. Available from: http://www.cdc.gov/tobacco/sgr/sgr_2004/index.htm.
20. Statistics Canada. National Longitudinal Study on Children and Youth, 1994-1995 Data. Ottawa: Statistics Canada; 2004.
21. National Cancer Institute. Cancer facts: smokeless tobacco and cancer [on-line]. Bethesda (MD): NCI; May 2003 [cited 2004 Jul 16] Available from: http://cis.nci.nih.gov/fact/3_63.htm.
22. California Department of Health Services. Tobacco Control Section. Cigars: not a harmless fad [on-line]. Sacramento (CA): The Department [cited 2004 Jul 16]. Available from: <http://www.dhs.ca.gov/tobacco/documents/cigarsFactSheet.pdf>.
23. U.S. Environmental Protection Agency. Fact sheet: respiratory health effects of passive smoking [on-line]. Washington (DC): EPA; 1993 [cited 2004 Jul 8]. Available from: <http://www.epa.gov/smokefree/pubs/etsfs.html>.
24. Alberta Alcohol and Drug Abuse Commission. Just the facts: second-hand smoke [on-line]. Edmonton: AADAC [cited 2004 May 19]. Available from: http://www.zoot2.com/justthefacts/tobacco/secondhand_smoke.asp.
25. Health Canada. Second hand smoke. Fact sheet #2 [on-line]. Ottawa: Health Canada [cited 2004 Jul 14]. Available from: http://www.hc-sc.gc.ca/hecs-sesc/tobacco/facts/blueribbon/sfpp_3.html.
26. Papanonopoulos G. Smoking influences decision making in periodontal therapy: a retrospective clinical study. *J Periodontol.* 1999;70(10):1166-73.
27. Scabbia A, Cho KS, Sigurdsson TJ, Kim CK, Trombelli L. Cigarette smoking negatively affects healing response following flap debridement surgery. *J Periodontol.* 2001;72(1):43-49.
28. Brothwell D. Should the use of smoking cessation products be promoted by dental offices? An evidence-based report. *J Can Dent Assoc.* 67(3):149-155.
29. Bain CA, Moy PK. The association between the failure of dental implants and cigarette smoking. *Int J Oral Maxillofac Implants.* 1993;8(6):609-15. In: Sandhu HS. A practical guide to tobacco cessation in dental offices. *J Can Dent Assoc.* 2001;67(3):153-7.
30. National Cancer Institute of Canada. Canadian cancer statistics 2000. Toronto: The Institute; 2000.
31. Winn DM. Tobacco use and oral disease. *J Dent Educ.* 2001;65(4):306-12.
32. Grossi SG, Zambon JJ, Ho AW, Koch G, Dunford RG, Machtei EE, Norderyd OM, Genco RJ. Assessment of risk for periodontal disease. I. Risk indicators for attachment loss. *J Periodontol.* 1994;65(3):260-7.
33. Tomar SL, Asma S. Smoking-attributable periodontitis in the United States: findings from NHANES III. *J Periodontol.* 2000; 71(5):743-51.
34. Campbell HS, Simpson EH, Petty TL, Jennett PA. Addressing oral disease – the case for tobacco cessation services. *J Can Dent Assoc.* 2001;67(3):141-4.
35. Special focus: reducing tobacco use. *Chronic Dis Notes Reports.* 2001;14(3):13.
36. Fried JL. The tobacco-using client: clinical issues. *J Mass Dent Soc.* 2001;50(1):14-19.
37. Johnson GK, Hill M. Cigarette smoking and the periodontal patient. *J Periodontol.* 2004;75(2):196-209.
38. Fried JL. Women and tobacco: oral health issues. *J Dent Hyg.* 2000;74(1):49-55.
39. Tomar SL, Winn DM. Chewing tobacco use and dental caries among U.S. men. *J Am Dent Assoc.* 1999;130(11):1601-10.
40. American Academy of Periodontology. Position paper: Tobacco use and the periodontal patient. *J Periodontol.* 1999;70(11):1419-27.
41. Fried JF. The periodontal ramifications of smokeless tobacco use. *Case Studies Perio Management.* 1996;II:1-8.

42. Alberta Alcohol and Drug Abuse Commission. Health consequences of spit tobacco. Chapter 5 in: Tobacco basics handbook [on-line]. Edmonton: AADAC; 2004 [cited 2004 Jul 12]. Available from: http://tobacco.aadac.com/about_tobacco/tobacco_research/tbh_5.pdf.
43. Winn DM, Blot WJ, Shy CM, Pickle LW, Toledo A, Fraumeni JF. Snuff dipping and oral cancer among women in the southern United States. *N Engl J Med*. 1981;304(13):745-9.
44. Rodu B, Cole P. Smokeless tobacco use and cancer of the upper respiratory tract. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2002;93(5):511-5.
45. Hilgers KK, Kinane DF. Smoking, periodontal disease and the role of the dental profession. *Int J Dent Hyg*. 2004;2(2):56-63.
46. Louisiana Department of Health and Hospitals, Office of Public Health, Tobacco Control Program and Chronic Disease Epidemiology Unit. Smoking attributable mortality, morbidity, and economic costs (SAMMEC) Louisiana-1999 [on-line]. [New Orleans](LA): The Department; 1999 [cited 2004 Jul 26]. Available from: <http://www.oph.dhh.state.la.us/chronicdisease/behavioralrisk/docs/Sammec99.pdf>.
47. Johnston LD, O'Malley PM, Bachman JG. Monitoring the future. National results on drug use, 1975-2002: Volume I, Secondary school students. NIH Publication No. 03-5375. Bethesda (MD): National Institute on Drug Abuse; 2003. p. 34, 70.
48. U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. An ounce of prevention.... What are the returns? 2nd ed. Atlanta (GA): CDC; 1999 [cited 2004 Aug 11]. Available from: <ftp://ftp.cdc.gov/pub/Publications/mmwr/other/ozprev.pdf>.
49. Stephens T, Kaiserman MJ, McCall DS, Sutherland-Brown C. School-based smoking prevention: economic costs versus benefits. *Chronic Dis Can*. 2000;21(2):62-67.
50. Campbell HS, Sletten M, Petty T. Patient perceptions of tobacco cessation services in dental offices. *J Am Dent Assoc*. 1999;130(2):219-26.
51. Newton JT, Palmer RM. The role of the dental team in the promotion of smoking cessation. *Br Dent J*. 1997;182(9):353-5.
52. Douglas-England K, TriAd Research Group Inc. AAA program final evaluation report. Edmonton: Alberta Alcohol and Drug Abuse Commission; 2004.
53. U.S. Department of Health and Human Services. Public Health Service. You can quit smoking. Consumer guide [on-line]. Washington (DC): PHS; June 2000 [cited 2004 May 30]. Available from: <http://www.surgeongeneral.gov/tobacco/consquits.htm>.
54. Department of Health and Human Services. Public Health Service. Frequently asked questions about quitting smoking [brochure] [on-line]. Washington (DC): PHS [cited 2004 Jul 8]. Available from: <http://www.surgeongeneral.gov/tobacco/faq.htm>.
55. Fiore MC, Bailey WC, Cohen SJ, et al. Evidence. Chapter 6 in: Treating tobacco use and dependence. Clinical practice guideline [on-line]. Rockville (MD): U.S. Department of Health and Human Services. Public Health Service; June 2000 [cited 2004 Jul 24]. Available from: <http://www.ncbi.nlm.nih.gov/books/bv.fcgi?call=bv.View..ShowSection&rid=hst42.section.7838>.
56. Conversation with Kerri McCaig, Tobacco Reduction Coordinator, Prince George, B.C., April, 2004
57. Communication from B. Kassirer-Shniffer on Toronto dental hygienists' use of the publication "Getting Rid of an Old Flame: A Tobacco-Use Cessation Program for the Dental Team"
58. Canadian Dental Hygienists Association. Comprehensive report of the smoking cessation survey. Ottawa: CDHA; May 6, 2004.
59. Fried J, Rubinstein L. Attitudes and behaviors of dental hygienists concerning tobacco use. *J Public Health Dent*. 1990;50(3):172-7.
60. Gussy M, Newton JT, Palmer RM. The role of dental hygienists in the promotion of smoking cessation. *Dental Health*. 1996;35:5-8.
61. Yakiwchuk CA, Stasiuk HM, Wiltshire W, Brothwell DJ. Tobacco use among young Aboriginal athletes. Poster presentation at the 2004 CDHA professional conference.
62. Alberta Dental Hygienists Association. In touch [ADHA newsletter] [on-line]. Edmonton: ADHA; April 2004 [cited 2004 May 19]. Available from: <http://www.adha.ca/pub/intouch/ITApr2004.pdf>. (ADHA is working in conjunction with Alberta Alcohol and Drug Abuse Commission on a Continuing Education CD-Rom for dental hygienists regarding spit tobacco cessation.)
63. Conversation with the Alberta Dental Hygienists Association. This Association, together with the Alberta Alcohol and Drug Abuse Commission, the provincial dental and dental assistant associations and health regions, are involved in a province-wide smoking cessation program that provides support for oral health professionals to use the Ask, Advise and Assist program, developed in 2002.
64. Canadian Dental Hygienists Association. First Nations and Inuit oral health: an oral presentation to the House of Commons Standing Committee on Health [on-line]. Ottawa, April 30, 2003 [cited 2004 May 19]. Available from: <http://www.cdha.ca/content/newsroom/reports.asp>.
65. Hastreiter RF, Bakdash B, Roesch MH, Walseth J. Use of tobacco prevention and cessation strategies and techniques in the dental office. *J Am Dent Assoc*. 1994;125(11):1475-81.
66. Dolan T, McGorray S, Grinstead-Skigen CL, Mecklenburg R. Tobacco control activities in U.S. dental practices. *J Am Dent Assoc*. 1997;128(12):1669-79.
67. Brothwell DJ, Armstrong K. Smoking cessation services provided by dental professionals in a rural Ontario health unit. *J Can Dent Assoc*. 2004;70(2):94-8.
68. Barker GJ, Williams KB. Tobacco use cessation activities in U.S. dental and dental hygiene student clinics. *J Dent Educ*. 1999;63(11):828-33.
69. Clovis J, Horowitz A, Poel D. Oral and pharyngeal cancer: knowledge, opinions, and practices of dental hygienists in British Columbia and Nova Scotia. *Probe*. 2003;37(3):109-122.
70. Forrest JL, Horowitz AM, Shmueli Y. Dental hygienists' knowledge, opinions, and practices related to oral and pharyngeal cancer risk assessment. *J Dent Hyg*. 2001;75(4):271-81.
71. Martin LM, Bouquot JE, Wingo PA, Heath CW. Cancer prevention in the dental practice: oral cancer screening and tobacco cessation advice. *J Public Health Dent*. 1996;56(6):336-40.
72. Canto MT, Drury TF, Horowitz AM. Use of skin and oral cancer examinations in the United States, 1998. *Prev Med*. 2003;37(3):278-82.
73. Secker-Walker RH, Solomon LJ, Haugh LD, Welsh D, Tatro M, Witham L, Hill HC, Mercier SM. Smoking cessation advice delivered by the dental hygienist. *Dent Hyg*. 1988;62(2):186-92.
74. Macgregor, I.D.M.: Efficacy of dental health advice as an aid to reducing cigarette smoking. *Br Dent J*, Vol. 180, Issue 8: 292-6, 1996
75. Severson HH, Andrews JA, Lichtenstein E, Gordon JS, Barckley MF. Using the hygiene visit to deliver a tobacco cessation program: results of a randomized clinical trial. *J Am Dent Assoc*. 1998;129(7):993-9.
76. Stevens VJ, Severson HH, Lichtenstein E, Little SJ, Leben J. Making the most of a teachable moment: a smokeless-tobacco cessation intervention in the dental office. *Am J Public Health*. 1995;85(2):231-5.
77. Walsh MM, Hilton JF, Masouredis CM, Gee L, Chesney MA, Ernster BL. Smokeless tobacco cessation intervention for college athletes: results after 1 year. *Am J Public Health*. 1999;89(2):228-34.
78. Walsh MS, Hilton JF, Ellison JA, Gee L, Chesney MA, Tomar SL, Ernster VL. Spit (smokeless) tobacco intervention for high school athletes: results after 1 year. *Addict Behav*. 2003;28(6):1095-113.

79. Little SJ, Stevens VJ, Severson HH, Lichtenstein E. Effective smokeless tobacco intervention for dental hygiene patients. *J Dent Hyg.* 1992;66(4):185-90.
80. Greene JC, Walsh MM, Masouredis C. A program to help major league baseball players quit using spit tobacco. *J Am Dent Assoc.* 1994;125(5):559-68.
81. Lancaster T, Silagy C, Fowler G. Training health professionals in smoking cessation. *Cochrane Database Syst Rev.* 2000;(3):CD000214.
82. Campbell HS, Petty LP, Meadows LM, Simpson L, Jennett PA. Improving tobacco cessation services in rural dental offices – recruitment to a randomized controlled trial. *Can J Comm Dent.* 1997;12(2):15-22.
83. U.S. Public Health Services, the Tobacco Use and Dependence Clinical Practice Guideline Panel, Staff and Consortium Representatives. Consensus statement: a clinical practice guideline for treating tobacco use and dependence. A U.S. Public Health Service report [on-line]. *J Am Med Assoc.* 2000;283(24):3244-54 [cited 2004 Jan 20]. Available from: <http://jama.ama-assn.org/cgi/content/abstract/283/24/3244>. Also available from: http://www.nci.nih.gov/cancerinfo/pdq/prevention/control-of-tobacco-use/healthprofessional/#Section_135 [cited 2004 May 19].
84. National Cancer Institute. Prevention and cessation of cigarette smoking: Control of tobacco use [on-line]. Bethesda (MD): NCI; March 2004 [cited 2004 May 19]. Available from: http://www.nci.nih.gov/cancerinfo/pdq/prevention/control-of-tobacco-use/healthprofessional/#Section_135.
85. Sandhu HS. A practical guide to tobacco cessation in dental offices. *J Can Dent Assoc.* 2001;67(3):153-7.
86. Heatherton TF, Kozlowski LT, Frecker RC, Fagerström KO. The Fagerström test for nicotine dependence: a revision of the Fagerström Tolerance Questionnaire. *Br J Addict.* 1991;86(9):1119-27. In: Sandhu HS. A practical guide to tobacco cessation in dental offices. 2001;67(3):153-7.
87. Goldberg D, Hoffman A, Anel D. Understanding people who smoke and how they change: a foundation for smoking cessation in Primary Care, Part 1. *Dis Mon.* 2002;48(6):385-439.
88. Prochaska J, Norcross J, DiClemente CC. *Changing for Good: The Revolutionary Program That Explains the Six Stages of Change and Teaches You How to Free Yourself from Bad Habits.* New York: William Morrow; 1994.
89. Pallonen UE. Transtheoretical measures for adolescent and adult smokers: similarities and differences. *Prev Med. Youth tobacco cessation supplement.* 1998;27(5 Pt 3):A29-38.
90. Lancaster T, Stead LF. Individual behavioural counselling for smoking cessation. *Cochrane Database Syst Rev.* 2000;(2):CD001292. Updated in: *Cochrane Database Syst Rev.* 2002;(3):CD001292.
91. Silagy C. Physician advice for smoking cessation. *Cochrane Database Syst Rev.* 2000;(2):CD000165. Updated in: *Cochrane Database Syst Rev.* 2001;(2):CD000165.
92. Lancaster T, Stead LF. Self-help interventions for smoking cessation. *Cochrane Database Syst Rev.* 2000;(2):CD001118. Updated in: *Cochrane Database Syst Rev.* 2002;(3):CD001118.
93. Stead LF, Lancaster T, Perera R. Telephone counselling for smoking cessation. *Cochrane Database Syst Rev.* 2001;(2):CD002850. Updated in: *Cochrane Database Syst Rev.* 2003;(1):CD002850.
94. Health Canada, correspondence. *Quit Smoking 2004: Key Issues and Q & A.* Ottawa: Health Canada; 2004.
95. Secker-Walker RH, Gnich W, Platt S, Lancaster T. Community interventions for reducing smoking among adults. *Cochrane Database Syst Rev.* 2002;(3):CD001745.
96. Ussher MH, West R, Taylor AH, McEwen A. Exercise interventions for smoking cessation. *Cochrane Database Syst Rev.* 2000;(3):CD002295.
97. Abbot NC, Stead LF, White AR, Barnes J, Ernst E. Hypnotherapy for smoking cessation. *Cochrane Database Syst Rev.* 2000;(2):CD001008.
98. Green JP, Lynn SJ. Hypnosis and suggestion-based approaches to smoking cessation: an examination of the evidence. *Int J Clin Exp Hypn.* 2000;48(2):195-224.
99. White AR, Rampes H, Ernst E. Update of: Acupuncture for smoking cessation. *Cochrane Database Syst Rev.* 2002;(2):CD000009.
100. U.S. Department of Health and Human Resources. Public Health Service. Treating tobacco use and dependence: PHS clinical practice guideline. Clinical guidelines for prescribing pharmacotherapy for smoking cessation [on-line]. Revised 2000. Bethesda (MD): PHS; 2000 [cited 2004 Jul 24]. Available from: <http://www.surgeongeneral.gov/tobacco/prescrib.htm>.
101. Lavelle C, Birek C, Scott D. Are nicotine replacement strategies to facilitate smoking cessation safe? *J Can Dent Assoc.* 2003;69(9):592-7.
102. Silagy C, Lancaster T, Stead L, Mant D, Fowler G. Nicotine replacement therapy for smoking cessation. *Cochrane Database Syst Rev.* 2000;(3):CD000146. Updated in: *Cochrane Database Syst Rev.* 2001;(3):CD000146 and in: *Cochrane Database Syst Rev.* 2002;(4):CD000146.
103. Ontario Medical Association. Rethinking stop smoking medications: myths and facts [on-line]. Toronto: OMA; June 1999 [cited 2004 Aug]. Available from: <http://www.oma.org/phealth/stopsmoke.htm>.
104. Goolsby M. Clinical practice guidelines: treating tobacco use and dependence. *J Am Acad Nurse Practitioners.* 2001;13(3):101-5.
105. Hatsukami DK, Severson HH. Oral spit tobacco: addiction, prevention and treatment. *Nicotine Tob Res.* 1999;1(1):21-4.
106. Ebbert JO, Rowland LC, Montori VM, Vickers KS, Erwin PJ, Dale LC. Treatments for spit tobacco use: a quantitative systematic review. *Addiction.* 2003;98:569-83.
107. Goldstein MG. Bupropion sustained release and smoking cessation. *J Clin Psychiatry.* 1998;59(Suppl 4):66-72.
108. Hughes JR, Stead LF, Lancaster T. Antidepressants for smoking cessation. *Cochrane Database Syst Rev.* 2000;(4):CD000031. Updated in: *Cochrane Database Syst Rev.* 2002;(1):CD000031 and in: *Cochrane Database Syst Rev.* 2003;(2):CD000031.
109. Vaszar LT, Sarinas PS, Lillington GA. Achieving tobacco cessation: current status, current problems, future possibilities. *Respiration.* 2002;69(5):381-4.
110. Hughes JR, Stead LF, Lancaster T. Anxiolytics for smoking cessation. *Cochrane Database Syst Rev.* 2000;(4):CD002849.
111. Lancaster T, Stead LF. Mecamylamine (a nicotine antagonist) for smoking cessation. *Cochrane Database Syst Rev.* 2000;(2):CD001009.
112. Gourlay SG, Stead LF, Benowitz NL. Clonidine for smoking cessation. *Cochrane Database Syst Rev.* 2000;(2):CD000058.
113. Lancaster T, Stead LF. Silver acetate for smoking cessation. *Cochrane Database Syst Rev.* 2000;(2):CD000191. 