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# Chapter 6

## Cessation

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# Enough Snuff: ST Cessation From the Behavioral, Clinical, and Public Health Perspectives

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**ABSTRACT** Despite concerns over the high prevalence and detrimental health effects of regular smokeless tobacco use by American males, there has been little research on assisting users to quit. A review of research shows promising results by adapting smoking cessation procedures. A review of clinical cessation studies and psychosocial studies provides support for development and assessment of ST cessation clinical and self-help programs. Distinctive aspects of ST cessation include the high prevalence of oral lesions, need for an oral substitute during withdrawal, the potential use of nicotine polacrilex as an adjunct, perception of ST as a safe alternative to smoking, frequent use of both cigarettes and ST, and difficulty in using nicotine-fading approaches. Specific components and measures involved in ST cessation are reviewed. Support for public health interventions is provided by a recent study of ST cessation in HMO dental clinics that demonstrated the efficacy of providing ST users advice to quit in the context of health care delivery. Cessation materials have also been developed for special populations, such as Native Americans and baseball players.

**INTRODUCTION** Over the past 6 yr, there has been a great deal of public interest in and scientific attention to the detrimental health effects of smokeless tobacco use. The publication of the Surgeon General's report on ST use (US DHHS, 1986a) and the publicity surrounding the NIH Consensus Development Conference on Smokeless Tobacco (US DHHS, 1986b) focused attention on these health concerns. These publications identified three major health risks associated with the oral use of tobacco: oral cancer, development of leukoplakia and other oral health problems, and nicotine addiction. These two documents increased public awareness and spurred Congress to pass House Bill 99-252, the Smokeless Tobacco Act of 1986. This act instituted rotating health warnings on ST products and eliminated radio and television ads for ST. Although the focus on ST increased public awareness of health effects, the sales of ST products have increased steadily with only a minor flat spot in the growth curve following the enactment of Public Law 99-252.

Because the majority of new users of ST products are young teen males, recent research programs have focused on preventing young people from taking up the use of snuff or chew through school-based prevention programs (Severson and Zoref, 1991). Despite these educational efforts, the use of ST, especially moist snuff, is increasing, especially among male adolescents and young male adults (US DHHS, 1986a). As of 1986, there were already an estimated 6 million regular users of ST in the United States (US DHHS, 1986a). Unfortunately, there has been little effort toward assisting current users in quitting their habitual use of snuff or chewing tobacco.

Despite the concern for potential negative health consequences, scientific study of ST cessation has lagged behind epidemiological, health, and preventive efforts. To date, there are few published studies on ST cessation, although several are currently in progress.

This paper broadly reviews the field of smokeless tobacco cessation. Published and unpublished studies are reviewed to provide a current assessment of ST cessation and guide future studies. Psychosocial studies that provide information on ST use and can guide development and implementation of effective cessation programs are also considered. The paper concludes with a review of ongoing public health interventions that provide direction on development of broad-based efforts to promote ST cessation.

**CLINICAL ST CESSATION STUDIES** Currently, there are only three published cessation studies involving smokeless tobacco. Unfortunately, these studies had relatively small samples and could be best characterized as pilot clinical research. Although they are not well-controlled randomized clinical trials, they are instructive.

The first published study of ST cessation was done by Glover (1986) who adapted the American Cancer Society's FreshStart Adult Smoking Cessation Program for use with 41 adult ST users. He reported a 6-mo abstinence rate of only 2.3 percent. However, these subjects were mandated to attend the program, as they had been found in violation of school rules at a college that prohibited the use of tobacco products. Given the non-voluntary nature of the subject sample, it is not unexpected to find a low success rate in cessation. Subsequent studies by Eakin and coworkers (1989) and DiLorenzo and coworkers (1991) provide a more optimistic view of the potential cessation rates that can be achieved by formal ST cessation treatment.

Eakin and coworkers (1989) reported an intervention with adolescent daily users, aged 14 to 18, who were recruited by referrals from counselors, coaches, and teachers in Eugene, Oregon, high schools. The study had 25 chronic ST users with a quasi-experimental design in which 11 of the 25 subjects provided a comparison group by receiving delayed treatment (3-wk delay). This behavioral treatment consisted of three 1-h small-group meetings led by counselors. The multiple-component treatment was cognitive-behavioral in nature and focused on encouraging subjects to use coping skills for cessation. Of the 21 subjects completing treatment, 9 were successful in quitting their ST use at the end of treatment. Self-reported quitting was confirmed with saliva cotinine assessment, and subjects were followed up at 6 mo after treatment. Long-term cessation rates were reduced to 12 percent at 6-mo followup; however, subjects not achieving abstinence had a self-reported reduction of 45 percent in their daily use of ST from baseline levels. The participants in this study who quit reported that, in addition to the group sessions, the ongoing telephone calls and support by the counselor were key elements in their success.

DiLorenzo and associates (1991) reported a multiple baseline design intervention on nine adult males recruited for a behavioral ST cessation program. Mean age of the subjects was 32 yr and the average length of use of ST was 9.3 yr. Seven subjects completed the eight 1-h behavioral treatment sessions provided over a period of 7 wk in small groups of three subjects each. Cue extinction, setting a target date for quitting, the use of a buddy system, and relapse prevention were the primary components of the

intervention. Cue extinction involved identifying two or three situations most strongly associated with ST use and breaking these associations by refraining from taking a dip for 30 min. Cessation of ST use was associated with the introduction of the program. Six subjects remained abstinent through the treatment phase and remained abstinent at the 9-mo followup. These data were confirmed by collateral sources. The program appears to be quite successful, although the modest number of subjects dictates caution in interpretation of this study.

The studies to date show that, for subjects who wish to quit, clinical cessation techniques based on smoking cessation are modestly effective. The 6-mo followup by Eakin and coworkers (1989) is discouraging, as there was high level of relapse, although 43 percent of the subjects who completed the treatment were able to quit. DiLorenzo and associates (1991) demonstrated the effectiveness of cue extinction procedures and the importance of getting the user to eliminate ST use first in situations in which the person is usually cued to use ST. Unfortunately, the studies have modest numbers of subjects and lack a comparison, no-treatment group.

There are several unpublished studies in cessation of ST use. Dorothy Hatsukami and colleagues at the University of Minnesota report promising results using nicotine polacrilex gum (Nicorette) as part of a behavioral group treatment program for adult ST users. They found no difference between the use of the gum ad libitum or on a fixed interval schedule, or between the 2 mg and 4 mg doses, in initial or 3-mo followup quit rates. Dr. Hatsukami reports that approximately 75 percent of the adult men had quit ST at the end of treatment (Hatsukami, personal communication, 1991).

Other studies are in progress. These studies involve comparing active and placebo nicotine gum as an adjunctive aid for a multicomponent cessation program for adult ST users, as well as studies of adolescent and adult cessation using ground mint leaf products as a snuff substitute.

From the discussion above of clinical studies to date, ST cessation involves adapting smoking cessation procedures. By and large, ST treatment programs have adapted standard cognitive-behavioral techniques used in smoking cessation programs. Personal communication with counselors indicates that self-help smoking cessation materials can be readily adapted and used by ST users. In our study of adolescent users, we depended heavily on the adaption of smoking cessation materials for each of the group sessions (Eakin et al., 1989). Further research and clinical experience are needed to determine how ST cessation differs from smoking cessation.

**IMPLICATIONS FROM OTHER ST STUDIES** Studies assessing ST quit efforts, health problems, and use patterns provide additional information that can have direct implications on the design and implementation of a cessation program.

**Quit Attempts** Studies support the need for ST cessation. Men who use ST appear interested in quitting. Researchers report that recruitment in current ongoing studies has not been a problem. In our current study assessing nicotine gum, 675 men responded to twice-weekly newspaper ads (for 7 wk)

soliciting daily ST users for a cessation program. In interviews, 64 percent of ST users have reported that they would make a serious quit attempt in the next 6 mo (Severson et al., 1990a). Of those trying to quit, 68 percent reported an average of four attempts each, and 77 percent of those quit attempts were “cold turkey” efforts. Additional support comes from a survey of dental patients in which 54 percent of ST users reported that they would make a quit attempt in the next year (Severson et al., 1990b). Ary and coworkers (1989) found that more than one-third of current male adolescent ST users reported unsuccessful quit attempts. Novotny and coworkers (1989) in a national probability sample found a large percentage (39.1 percent) of adult ST users had made unsuccessful attempts to quit. Most studies to date have been convenience samples or subsets of other studies. There is a need for a general population survey of ST users with regard to quit attempts, success rates of self-quitting, interest in cessation assistance, and relapse of self-quitters.

**Oral Health Problems** We also know that regular users often experience oral health problems that they can easily identify, and these can be used to motivate them to institute a quit attempt. Two-thirds of regular daily ST users reported that they had experienced health problems that they directly attributed to their use of snuff (Severson et al., 1990a). These symptoms included bleeding and sore gums, lesions, receding gums, and upset stomach from swallowing the juice. Although the sample in the study of Severson and associates (1990a) was a self-selected sample of adult daily ST users, there is ample evidence of frequent oral health problems among daily users (Glover et al., 1989; Schroeder, 1989; US DHHS, 1986a). Estimates are that more than 50 percent of regular users have at least a degree 1 (early-stage) leukoplakia lesion (Glover et al., 1989). Our own study of dental patients revealed that 78 percent of ST users had detectable oral lesions, and these were distributed evenly across three levels of severity (Little et al., in press). These lesions, along with bleeding and receding gums (gingivitis), can motivate a user to seek cessation assistance and provide an objective outcome from cessation, because the lesions usually heal quickly after ST cessation.

**Nicotine Addiction** Studies of nicotine absorption by snuff and chewing tobacco users conclude that venous plasma nicotine levels are similar in users of ST and cigarettes (Benowitz et al., 1988). Gritz and coworkers (1981) and Russell and coworkers (1981) concluded that plasma nicotine and cotinine levels for daily habitual snuff users were comparable to those of a group of heavy smokers. Finally, it appears that physiological dependence develops regardless of whether nicotine is taken in through a cigarette, smokeless tobacco, or nicotine polacrilex (Hughes and Hatsukami, 1986).

**Withdrawal Symptoms and Substitutes** We also know that symptoms experienced during ST withdrawal appear to be the same as those for smoking cessation (Hatsukami et al., 1987; Severson et al., 1990a). Hatsukami and colleagues reported that ST users experienced cravings, irritability, distractibility, and hunger, but the symptoms were less intense and fewer in number than those of the cigarette smokers. Self-report measures of withdrawal symptoms can be readily adapted from smoking cessation programs.

In response to their withdrawal symptoms, persons going through treatment for ST addiction often request an oral substitute. Chewers report using cinnamon sticks, gum, sunflower seeds, finely ground mint leaves, or other chewed foodstuff substitutes for ST during withdrawal. Unpublished case reports and ongoing cessation studies report success with ad libitum use of a mint snuff-like product as an ST substitute. This product, which contains finely ground mint in tins, is used in the same way as snuff but provides no nicotine.

**Cigarette Smoking**

We also know that there is a co-morbidity with cigarette smoking. In studies we have done in ST cessation, we have found that 25 to 30 percent of all regular ST users also use cigarettes (Eakin et al., 1989; Little et al., in press; Severson, in press). This is important because we may get people to quit ST but then increase their use of cigarettes. This would result in no net gain in the health risk status of subjects, and they would remain addicted to nicotine. The use of cigarettes by ST users has serious implications for cessation efforts. A dental-based intervention described later in this paper reported significantly lower cessation rates among men who use both tobacco products than those who use ST exclusively (Hollis et al., in press).

Studies of psychosocial factors in ST use and physical dependence on nicotine support the adoption of cognitive-behavioral multicomponent smoking cessation programs for use in ST cessation. There is ample evidence that regular ST users make quit attempts and experience serious withdrawal symptoms when quitting (Hatsukami et al., 1991). The plasma nicotine levels for ST users approximate those of a regular smoker, and the levels of nicotine dependence are similar for both groups. The use of cigarettes is high for ST users, and this factor can be problematic in getting a person to quit ST use. Unfortunately, we also have much to learn. Although the preliminary evidence is that ST cessation rates are similar to smoking cessation rates, the small sample sizes, self-selective nature of subjects, the lack of control groups, and lack of long-term followup make one cautious about any interpretation. Particular areas to focus on include determining how cessation processes differ by level of ST use. Also, we do not know the relapse rates because the followup on studies has been minimal. We know little about the use of nicotine replacement in cessation self-help quitting, effects of a health professional's advice, or the effects of work site restriction in use. In other words, although the field of smoking cessation has a well-established research base, ST cessation lags far behind in answering the same questions.

**UNIQUE ASPECTS OF ST CESSATION**

Smokeless tobacco use presents some unique issues that need to be considered. First, we have to remember that snuff can be used without other people being aware. This surreptitious behavior provides some difficulty in monitoring the use of snuff by others and allows use in situations where its use is not permitted (e.g., in school classrooms or on the job).

Second, the frequent oral lesions experienced by ST users provide the cessation counselor with a direct proximal measure of a physical problem caused by ST use. For a cigarette smoker, it is often difficult to point out direct evidence of detrimental health effects from smoking.

Third, cigarettes can be used during ST withdrawal. As described above, up to one-third of men also use cigarettes and may smoke during the ST withdrawal process to minimize cravings.

Fourth, we know that ST is perceived as a safe alternative and that perception may result in less motivation to quit. Chewers perceive ST use to be less harmful than smoking, although most nonchewers disagree (Bauman et al., 1989; Lichtenstein et al., 1984). Among youth, 86 percent regard ST as a safe alternative to cigarette smoking (US DHHS, 1986c). There is a higher acceptance of teenage ST use by parents than of smoking (Chassin et al., 1985). Parents' acceptance of their sons' chewing or dipping contributes to the general perception that this behavior is acceptable and encourages continued use.

And fifth, some of the cessation approaches that are used for cigarette smoking are not easily translated to ST because snuff and chewing tobacco products are generally not packaged in individual doses. For example, it is difficult to do nicotine-fading procedures (i.e., gradually reducing the amount of bioavailable nicotine). The lack of a standard dose, as in a cigarette, makes gradual reduction procedures difficult to self-monitor. The known nicotine content of cigarettes, via government reports, makes nicotine exposure relatively easy to compute. However, no comparable data on nicotine content of ST products are available, and individuals vary greatly in what constitutes a single pinch or dip (Severson et al., 1990a). Nicotine reduction procedures call for users to control the amount of nicotine exposure by either changing products or reducing the amount of snuff or chew they put in their mouths; however, in practice these procedures are difficult to implement because the nicotine content of the product is difficult to ascertain and the dip size is subjective.

**SUMMARY OF CLINICAL WORK** From clinical and psychosocial studies, we can conclude smoking cessation procedures can be adapted for use with ST users with minor modification. Preliminary information supports ST cessation success rates being similar to smoking cessation, but there are few published studies to date. Oral substitutes appear to be important adjuncts in ST cessation. Users report use of mint snuff or other oral substitutes in quitting programs. Nicotine polacrilex gum has a topography of use that is very similar to the topography of snuff or chew use, and its use may be better received by ST users than by smokers as an aid in cessation. This is supported by Hatsukami and our own experience where we found that ST users report compliant use of nicotine polacrilex gum as a part of cessation. The new transdermal nicotine patches could also be a valuable aid, but to date their use has not been evaluated for ST users. Finally, there is a unique opportunity for self-exam of the mouth to increase motivation and provide feedback on oral health recovery that accompanies cessation.

**COMPONENTS OF ST CESSATION** Adaptation of smoking cessation materials has been used in all aspects of ST cessation. A brief review of some of these measures and components may be useful. These include assessing motivation and readiness to quit, oral health measures, and assessing addiction level.



**Assessing Addiction Level** The most accurate way to measure addiction level would be to measure nicotine exposure via plasma nicotine levels or urinary cotinine levels. However, collecting blood or urine samples is invasive, and laboratory procedures for measuring nicotine or cotinine in body fluids are expensive. Unfortunately, the product packaging and lack of government testing of ST products for nicotine content preclude easy measurement of nicotine exposure. A parsimonious, but less accurate, procedure for estimating a subject's nicotine exposure level is to take the available nicotine level of their usual product and multiply that times number of tins per week. For example, if Copenhagen is used, which is a very high nicotine product with 30.76 mg/g, and a user reported using one tin of snuff per day or seven tins per week, his total nicotine exposure would be  $30.76 \text{ mg/g} \times 34.02 \text{ g per tin} \times \text{seven tins per week} = \text{approximately } 7,325 \text{ mg nicotine}$ . Products such as Skoal and Kodiak are considered medium in nicotine content with 10.7 mg/g and 14.6 mg/g, respectively (Hoffman et al., 1986). The low-nicotine snuff products include Hawken, Bandits, and Happy Days. Hawken, for example, has 5.7 mg/g of nicotine. To date, no data have been collected that correlate this computation of nicotine bioavailability and plasma nicotine levels; however, it appears that identifying the ST product used by the individual can assist in assessing addiction levels. Even if one does not compute the total bioavailable nicotine, the number of tins per week can give a general view of addiction. Schroeder and colleagues (1988) have suggested categorizing ST users as light, moderate, or heavy on the basis of the number of tins used per week. A light user would consume one tin or pouch or less per week, a moderate user would use one and one-half tins or pouches weekly, and a heavy user would be a person who uses more than two tins or pouches per week. This method is compromised by the wide disparity in the level of bioavailable nicotine in the various products as noted above.

An alternative measure of addiction is suggested by Eakin and coworkers (1989), who adapted the Fagerstrom Addiction Scale (Fagerstrom, 1978), which has been used in smoking cessation. Cigarette-based questions were converted to ST items (e.g., "I chew or dip the first thing in the morning within 30 minutes of waking"; "I swallow the juice when I can't spit"; "I chew or dip where it is prohibited"; and "I crave ST even when I'm sick in bed"). These items are scored plus or minus and the total of seven or more positive responses indicates the person is heavily addicted to ST. Although this measure is being used in a number of ongoing ST cessation studies, there are currently no validity data with ST users.

**Assessing Readiness To Quit** Another useful measure that can be adapted from smoking research is an assessment of readiness of the individual to quit. This involves using the Prochaska-DiClemente model (DiClemente et al., 1991; Prochaska and DiClemente, 1983) in which they postulate that the process of cessation can be conceptualized as along a continuum from precontemplation to contemplation to action in making an actual quit effort. The person's readiness to quit is assessed by questions such as, "Are you seriously considering quitting your use of chew or snuff in the next 6 months?" An affirmative response indicates the subject is at the contemplation stage. Agreement with statements such as, "I'm seriously going to quit my use of chew or snuff in the

next month," is an indication of readiness to make the commitment to quit. An alternative procedure to a series of questions is a 10-step "contemplation ladder" on which subjects indicate where they are in their readiness to quit by placing themselves on the ladder (Biener and Abrams, 1991).

**PUBLIC HEALTH INTERVENTIONS** Parallel to individual cessation programs of a clinical nature are public health cessation efforts. These efforts involve more population-based interventions that may be less effective in terms of quit rates but are more likely to affect large numbers of individuals who use ST. In the end, interventions of this type may have a much larger public health impact by getting more people to quit (Severson, 1980). These interventions are diverse and range from getting hygienists and dentists or physicians and nurses to provide ST users direct advice to quit, to policy changes in restrictions of sale and use of ST products. Health care professionals can advise patients to quit ST and provide materials regarding health risks in the context of regular health care. These interventions are minimal in terms of cost and time, but similar programs for smokers have been shown to have a significant impact on tobacco use (Vogt et al., 1989). Public health interventions also include media messages, such as radio or television public health messages, written materials, and information from voluntary groups (e.g., American Cancer Society and American Lung Association), policy changes such as work site restrictions on ST use, or restrictions on ST product sales to minors. Legislative actions such as increased taxation on ST products or putting health warnings on products are also considered public health interventions. Professional groups such as the American Dental Association and Academy of Otolaryngology have been active in publishing materials on the detrimental health effects of ST, and the distribution of these materials could also be considered a public health intervention.

An example of a public health cessation program was a 4-yr randomized trial that used dentists and hygienists as the providers of cessation advice (Little et al., in press). Men (aged 15 to 65) who came into HMO dental clinics for regular hygiene visits and identified themselves as ST users were randomized either to intervention or usual care based on an identification number. The dental office intervention involved first having a dentist or hygienist ask the patient about his tobacco use. Second, the clinician conducted an oral health exam and provided specific feedback on lesions in the mouth. Third, the practitioner provided direct advice to the patient to quit. The key element is for the dentist or hygienist or both to give a clear personal message that they believe ST use is harmful and they want the patient to quit. Fourth, patients were asked to watch a brief 10-min video that was motivational in nature, asked to set a quit date, and given self-help materials. There was also a 1-wk followup phone call by the hygienist to see how they were doing.

The results of this intervention were encouraging. Table 1 shows that the self-reported quit rate for the intervention group was 22 percent at the 3-mo followup. The usual care group had an overall cessation of only 14 percent. However, the cessation rates were very different for people who used only ST and those who used both ST and cigarettes. For men who used

Table 1  
**Three-month followup of dental intervention for ST users in an HMO**

	Baseline Status of Users		Self-Reported Quit Rates at 3-Mo Followup	
	Percentage	n	Percentage	n
<b>Intervention</b>				
ST only	69%	170	26%	45
ST and cigarettes	31	75	12	9
Overall cessation			22	54
<b>Usual Care</b>				
ST only	70	191	17	33
ST and cigarettes	30	81	3	5
Overall cessation			14	38

ST and cigarettes, the cessation rates were only 12 percent in the intervention group and 3 percent in the usual care group. It appears that men who used cigarettes were much less likely to be successful in giving up ST than were subjects who do not smoke cigarettes. The good news is that very few of the ST-only users reported subsequently smoking cigarettes. Only 3 percent of men who reported ST-only use at baseline and reported no ST use at followup reported smoking cigarettes.

There is increased attention being paid to special ST populations such as baseball players and Native Americans, among whom the use of ST by females is similar to males (Schinke et al., 1987 and 1989). Baseball players also represent a special group as ST use has long been associated with the sport, and these professionals are highly visible role models for American boys. Surveys report 34 to 39 percent of professional players report using ST in the past week (Connolly et al., 1988; Ernster, 1989). A recent publication by the National Cancer Institute is specifically targeted to baseball players and provides a self-help cessation manual (Orleans et al., 1991). Materials are needed that target other groups in which ST use is prevalent. Specific materials for cowboys, minority groups, and specific vocational groups (i.e., wood products or other factory workers) are more likely to be effective. Adolescent ST prevention programs have been developed under NCI funding and are being evaluated, but cessation programs for adolescent ST users have been lacking. The recent publication of a self-help quit pamphlet by the American Cancer Society (1991), and the first self-help manual for quitting snuff and chew on your own (Severson, 1992), offer valuable aids to counselors providing cessation advice to young chewers and dippers.

**SUMMARY** There is evidence emerging that men are interested in quitting their use of ST and that cessation programs can be developed that are modestly successful. The program content and success rates appear similar to multi-component smoking cessation programs. The need for oral substitutes such as mint snuff or nicotine polacrilex also appears important and suggests adjunctive aids.

There is a need for development and evaluation of cessation programs for ST users. There is a large group of men who are addicted to the nicotine in this tobacco product, estimated at 6 million American men (US DHHS, 1986a), but little has been done to assist them in quitting. There is a need for self-help quitting materials, cessation groups, and public health interventions. Preliminary evidence of successful adaptation of cognitive-behavioral smoking cessation programs is encouraging. That users report trying to quit on their own provides further support for developing cessation materials and providing access to cessation programs. Studies using nicotine replacement (nicotine polacrilex or transdermal nicotine patches) or oral substitutes such as mint snuff are needed to determine whether those adjuncts significantly increase long-term cessation rates. There are unique aspects of ST use that have not received adequate attention in cessation programs, and components (such as an oral self-exam) may provide significant motivation for the ST user to quit.

Public health interventions for ST users also show promise. Early results of a dental office-based intervention provide impetus for developing and implementing public health interventions that have proved successful in getting cigarette smokers to quit (Little et al., 1992). These interventions may involve health professionals providing direct advice to quit in the context of regular health care delivery. Special interventions may be most relevant for high ST user groups such as baseball players or wood product workers or ethnic groups such as Native Americans where prevalence of use is endemic. In sum, there is much to be done in ST cessation, but the groundwork has been laid and the direction and preliminary results are promising.

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# Smokeless Tobacco Cessation and Nicotine Reduction Therapy

Elbert D. Glover and Penny N. Glover

**ABSTRACT** Given the health and social consequences of smokeless tobacco, strategies to reduce and stop ST consumption and the occurrence of tobacco-related diseases warrant close examination and analysis. This paper examines ST use as an addiction and presents various pharmacological adjuncts for helping smokeless tobacco users with their addiction. Specifically, 2-mg nicotine polacrilex, 4-mg nicotine polacrilex, and transdermal nicotine patches are examined as potential pharmacological adjuncts for ST cessation.

**INTRODUCTION** For more than 150 years, it has been known that nicotine is absorbed by various organs (Orfila, 1851; Glover et al., 1989). Since 1950 we have known that the brain is the highest among all the organs in its ability to absorb nicotine (Werle and Meyer, 1950). Larson and his colleagues have extensively reviewed the various physiological and behavioral actions of nicotine (Larson and Silvette, 1968 and 1971; Larson et al., 1961). Here we provide the basic knowledge necessary for attempting smokeless tobacco cessation with nicotine therapy.

Since the turn of the century, it has been suspected that the central nervous system is the site of action for the tobacco effects sought by users (Armstrong-Jones, 1929; Russell and Feyerabend, 1981). Nicotine is a euphoriant (Henningfield and Nemeth-Coslett, 1988). In a series of abuse liability studies, Henningfield and Nemeth-Coslett found that nicotine produced dose-related increases in euphoria, as measured by the drug-liking scale. Their data demonstrated that increased euphoriant scale scores exceeded placebo values and were directly related to increased doses of nicotine, which identifies nicotine as a drug that produces dependence. As a psychoactive substance, nicotine exerts a number of effects on the brain and CNS. Once nicotine is absorbed into the blood, it is rapidly distributed and absorbed by the brain and other highly blood-perfused tissues (Henningfield and Nemeth-Coslett, 1988).

Animal experiments have shown that nicotine induces some of the same changes in brain energy utilization that have been observed with drugs like cocaine (Henningfield and Nemeth-Coslett, 1988). From the first use of tobacco, the self-administered dosage gradually escalates. Tolerance, the need to take larger doses to obtain the same physiological effect, begins during the earlier stages of drug dependence and is a major factor in dose escalation (Henningfield and Nemeth-Coslett, 1988). Henningfield and Nemeth-Coslett further report that the self-reported number of cigarettes smoked from day 1 through year 8 reveals that several years of smoking are required before a stable level of one to two packs of cigarettes per day is reached.

Johnston (1942), studying intravenous nicotine delivery in humans, came to the following conclusions:

- Smoking tobacco is essentially a means of administering nicotine, just as smoking opium was a means of administering morphine.
- Nicotine has a psychic action.
- The actions of intravenous nicotine are similar in temporal pattern and quality to those of inhaled tobacco smoke.
- Smokers show the same attitude toward tobacco as do people addicted to other drugs, and their judgment was therefore biased in giving an opinion of its effect on them.

Johnston's conclusions have been largely confirmed by a variety of techniques, including strategies available only in recent years.

Similar conclusions have been published by the National Institute on Drug Abuse, the Public Health Service, and an Advisory Committee to the U.S. Surgeon General (NIDA, 1984; US DHHS, 1983, 1986, and 1987). Drug addiction is most often defined as the behavior of repeatedly ingesting a substance that results in the delivery of a behavior-modifying chemical to the central nervous system (Schuster, 1980). The symptoms associated with nicotine withdrawal—craving, irritability, increasingly frequent waking from sleep, slowed heart rate, anxiety, impaired concentration, restlessness, drowsiness, impatience, confusion, increased hunger, and impaired reaction time—can undermine the tobacco user's motivation to stop (American Psychiatric Association, 1987). The stronger the dependence on nicotine, the lower the likelihood of successful tobacco cessation.

**NICOTINE IN SMOKELESS TOBACCO** Plasma nicotine and cotinine levels were measured in 12 ST users by Gritz and colleagues (1981). The subjects were male college students who used approximately one-third of a can of smokeless tobacco per day and did not smoke cigarettes (Gritz et al., 1981). The mean plasma nicotine concentration of the subjects prior to tobacco use was 2.9 ng/mL; this increased to 21.6 ng/mL after using smokeless tobacco throughout the day. The plasma nicotine and cotinine levels found in the ST users were comparable to concentrations found among regular cigarette smokers (Gritz, 1981). One-third of a can of ST per day is considered light use (Schroeder et al., 1988). Similarly, in England, Russell and colleagues (1980 and 1981b) found plasma nicotine levels in nasal snuff users reaching levels similar to those of heavy smokers, as well as exhibiting a more rapid rate of absorption than noninhaling cigar smokers. Furthermore, Russell and coworkers found plasma cotinine levels to average 23 percent higher among daily snuff users than among smokers.

**CESSATION PROGRAMS** Currently, there is little reported knowledge about smokeless tobacco cessation. Glover (1986) reported research on two smokeless tobacco cessation programs adapting the American Cancer Society's FreshStart Program for cigarette smokers. A total of 41 subjects initially enrolled in both programs (20 in the first and 21 in the second). Glover reported a



2.3 percent success rate for the quit-ST clinics at 6 mo, compared with his 38.0 percent success rate at 6 mo for cigarette smokers. Of the 41 ST users who attempted abstinence, only 1 of the participants was able to go for more than 4 h during the waking hours without using ST. Interestingly, the success of this one individual who did achieve long-term success (1-yr abstinence) was accomplished through a successive reduction of ST intake with nicotine polacrilex used as an adjunct. Nicotine gum after 6 mo was faded out.

After this experience, Glover concluded that smokeless tobacco appears to be more addictive than cigarette smoking. Given the results of the cessation program in which Glover had adapted the FreshStart Program, in 1986 the American Cancer Society convened an advisory group to provide guidance for a coordinated educational effort to develop an ST cessation manual for high school seniors. After 18 mo of development and revision, the cessation manual was completed and released in 1991. The manual is available through local chapters of the American Cancer Society (American Cancer Society, 1991). The self-help program relies heavily on the theoretical bases of social contracting, peer education, and relapse prevention (Glover et al., in press). Similar programs have been developed by others (Hatsukami, 1991a; Severson, 1987). All three are similar in presentation with one noted exception: Hatsukami's program uses nicotine polacrilex, which may be the most appropriate way to attempt ST cessation (Glover, 1992b). Given that the ST user and the smoker evidence similar nicotine and cotinine concentration levels (Gritz et al., 1981; Russell et al., 1980 and 1981), a similar therapy could be beneficial—specifically, nicotine reduction therapy.

### **Nicotine Reduction Therapy**

Both smokeless and smoking tobacco contain nicotine, which is the basis for addiction (Glover et al., 1989). If we are to assist ST users, nicotine reduction therapy (NRT) should be the basis for cessation programs, just as it is the basis for effective programs for smoking cessation. A decade ago, we used groups, education, counseling, social contracting, and social support to assist with smoking cessation (Glover et al., 1992b). Today, we are using NRT to assist smokers with successful cessation (Hatsukami, 1991b; Russell et al., 1983).

Both nicotine polacrilex and nicotine transdermal systems were developed in part to improve quit rates by helping to diminish withdrawal symptoms (particularly nicotine craving). Both have proven to be effective stop-smoking therapies. Because nicotine plasma and cotinine levels are similar after cigarette or smokeless tobacco use and because the addictive potential of ST can be as great as or greater than that of cigarettes, we need to begin to investigate NRT for ST cessation—specifically, 2-mg and 4-mg nicotine polacrilex and transdermal patches.

### **Nicotine Polacrilex (2-mg)**

Nicotine gum—nicotine polacrilex—has consistently been shown in clinical trials to be more effective than placebo or no intervention in terms of 6-mo and 1-yr abstinence rates (Hatsukami, 1991b). Nicotine polacrilex is successful with smokers when used in conjunction with a behavioral modification program (Russell et al., 1983; US DHHS, 1989 and 1990;

Wilson et al., 1988). Compliance problems are related to the patient's chewing correctly and chewing a sufficient number of pieces per day. Apparently many physicians do not provide proper chewing instructions to patients.

If used correctly, nicotine polacrilex can be an excellent pharmacological adjunct for smokeless tobacco cessation. Moreover, nicotine polacrilex is more like ST than cigarette smoking, so it provides a mimic cue. The method of absorption from the nicotine gum is similar to that of smokeless tobacco. Nicotine blood plasma levels, cotinine levels, placement of polacrilex and ST, and outward appearance (bulge in the gingival area while the material is in use) are identical. If researchers are to investigate nicotine polacrilex as a pharmacological aid for ST cessation, it is critical to avoid errors similar to those made with smoking cessation. Potential methodological errors include the following:

- Not using the proper chewing technique;
- Underdosing—not using sufficient quantities;
- Using nicotine with liquids; and
- Not using nicotine polacrilex in conjunction with some other type of behavior modification program (Cummings et al., 1988).

Nicotine  
Polacrilex  
(4-mg)

Nicotine polacrilex in the 4-mg dose is identical to 2-mg nicotine polacrilex except that it has twice the nicotine concentration. Currently, 4-mg nicotine polacrilex is not generally available in the United States; however, clinical trials have been conducted. Glover and colleagues (1992b) enrolled more than 500 highly dependent smokers (Fagerstrom score of 7 or greater) in a double-blind, placebo-controlled study. They found no significant difference in cessation rates between placebo and 2-mg nicotine polacrilex; however, the 4-mg version was found to be more effective than either placebo or the 2-mg dose with highly dependent smokers. Given the similarity of nicotine and cotinine levels in ST users and highly dependent smokers, it may well be that 4-mg gum is more effective with ST users than is the 2-mg version.

Transdermal  
Patch

The nicotine transdermal patch has promise for nicotine reduction therapy. A rate-controlling nicotine transdermal system has demonstrated efficacy in smoking cessation, including significant relief from nicotine craving (Transdermal Nicotine Study Group, 1991). The transdermal nicotine patch should afford fewer compliance problems than the nicotine gum because the patch is placed on the upper part of the body only once a day. Three pharmaceutical companies have 24-h patches approved by the Food and Drug Administration for smoking cessation, and a 16-h patch is currently awaiting FDA approval.

The patch delivers a specific amount of nicotine to the central nervous system every hour, allowing for a steady rate of nicotine absorption; consequently, withdrawal symptoms are minimized. This technique has been found to be very promising for cigarette smokers (Transdermal Nicotine

Study Group, 1991). Several transdermal nicotine systems are available, and they vary in nicotine dose, drug delivery design and technology, absorption and efficacy rates, and effects on skin. The patch eliminates the nicotine absorption peaks and troughs associated with nicotine polacrilex use (Hatsukami, 1991b). It is hoped that the new transdermal technology can be applied for ST users with similar success.

**Other Pharmacological Adjuncts** Several nicotine products that are in various phases of testing for smoking cessation could one day be used for ST cessation:

- Nicotine nasal spray—a device that delivers nicotine via the nose (Schneider, 1992);
- Oral inhaler—a device that delivers nicotine via the lungs (Glover et al., 1992a); and
- Oral lozenge—a device that delivers nicotine via the oral mucosa.

**Validating Self-Reports** One obstacle to the use of nicotine reduction therapy with ST cessation was the inability to validate self-reports. Previously, it was impossible to distinguish chemically the nicotine in smokeless tobacco from the nicotine in polacrilex gum. However, Peyton and Benowitz (1991) have developed a method for validating self-reports using excretion of the alkaloids anabasine and anatabine in the urine of ST users. Their test allows the researcher to validate self-reports for ST users attempting to quit with NRT.

In light of the available literature, NRT has potential benefits for smokeless tobacco cessation and deserves further study. NRT may well be our best hope for ST users.

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# Role of Dentists in Cessation Counseling: Survey Findings<sup>1</sup>

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**ABSTRACT** Dental professionals in public health and research have been instrumental in raising the public's awareness of smokeless tobacco, yet recent data indicate that the general dental practitioners' and specialists' role in reducing ST use has been underestimated and underused. A 73-item survey was mailed to 1,064 dentists in Central Ohio to ascertain their knowledge of and receptivity to providing an ST or tobacco use intervention in a clinical setting. Of the 529 dentists responding to the survey, only 9 percent stated that they were effective at getting their patients to stop using tobacco. Relative to ST cessation, 71 percent of the dentists would be willing to provide educational pamphlets on ST to their patients; 6 percent consider prescribing nicotine gum; 3 percent consider delegating prevention responsibility; and 15 percent consider referring to an outside cessation program. Of the dentists who responded, 73 percent felt cessation counseling was frustrating. Dentists considered that barriers to ST cessation counseling included their lack of training (66 percent) and lack of insurance coverage (73 percent). The results indicate the need for further education in tobacco and cessation counseling for dentists.

**INTRODUCTION** The dental professional's role in reducing smokeless tobacco use has been double-edged. Public health dentists and dental researchers studying the effects of ST (Archard and Tarpley, 1979; Axéll et al., 1976; Christen, 1980; Connolly, 1986; Greer, 1983; Hirsch et al., 1982; Hoge and Kirkham, 1983; Offenbacher and Weathers, 1985; Park et al., 1985; Pindborg and Renstrup, 1963; Poulson, 1983; Roed-Petersen and Pindborg, 1973; Schroeder, 1989; Schroeder et al., 1985, 1988a, 1990; Schroeder and Chen, 1985; Squires, 1984; Van Wyk, 1976) report that dental professionals have been among the most instrumental in scientific and public health awareness of ST. Lobbying efforts by dental professionals have played a major role in having the Federal Trade Commission change its final rules for warnings on snuff and chewing tobacco (*ADA News*, 1986). Yet recent data indicate that the dental practitioners' role in reducing ST use by their patients and in the community has been underestimated and underused (Fried and Rubinstein-DeVore, 1990; Geboy, 1990; Schroeder, 1989 and 1990; Schroeder et al., 1988b and 1990).

In the past 10 yr, we have found the increased use of snuff in countries such as Sweden and increases in dipping and chewing in the United States, particularly in high schools and with young adult males (Christen et al., 1979; Greer and Poulson, 1983; Hoffman et al., 1986; Poulson et al., 1984). Clinicians have noted associated oral problems such as dental caries, abrasion, gingivitis, gingival recession, periodontitis, leukoplakia, and oral cancer (Christen, 1980; Greer and Poulson, 1983; Greer et al., 1986 and 1988; Hoffman et al., 1986; Hoge and Kirkham, 1983; Offenbacher and Weathers, 1985; Pindborg and Renstrup, 1963; Roed-Petersen and Pindborg,

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1973; Schroeder et al., 1985) with the increased use of ST. Often, ST-induced lesions are found to have a hyperkeratotic white patch (leukoplakia) (Greer and Poulson, 1983; Greer et al., 1986 and 1988; Pindborg and Renstrup, 1963; Roed-Petersen and Pindborg, 1973). Leukoplakia is a white patch or plaque that cannot be characterized clinically or pathologically as any other disease (WHO, 1978) and is considered a premalignant lesion that has a transformation rate of more than 6 percent for either dysplasia or carcinoma (US DHHS, 1986).

Furthermore, nicotine concentrations in the blood of ST users have been shown to be as high as those in cigarette smokers, and exposure to nicotine from ST is 8 to 10 times higher than from an average package of cigarettes (Schroeder et al., 1988c and 1990). ST has further been related to increases in heart rate and blood pressure (Edwards et al., 1987; Gritz et al., 1981; Neal et al., 1988; Schroeder and Chen, 1985; Schroeder et al., 1988c and 1990; Squires et al., 1984). Thus, ST is a potential risk factor for coronary and peripheral vascular disease, peptic ulcer, reproductive disorders, and neuromuscular disease (US DHHS, 1986).

Health professionals in the past few years have become aware of the health hazards of ST, following the enactment of P.L. 99-252 aimed at decreasing ST use (Chen and Schroeder, 1990; Chen et al., 1991; Schroeder, 1990). The American Dental Association, American Medical Association, American Cancer Society, American Heart Association, Federal Government, and State dental health departments include ST information in their efforts to control tobacco use (CDC, 1986; Chen and Schroeder, 1987). Recently, the American Academy of Otolaryngology-Head and Neck Surgery began a 1-yr campaign with a comprehensive slide and lecture series (McGuirt, 1990) and videotape (American Academy of Otolaryngology-Head and Neck Surgery, 1990) offered to their members. The American Dental Association now offers several educational brochures and videotapes (ADA, 1990a and 1990b), and even the Office of the Commissioner of Major League Baseball worked with the National Cancer Institute to produce a booklet on ST education (US DHHS, 1991). Despite the availability of information on the health hazards of ST, in one screening only 10 percent of ST users reported that their dentist informed them that they had lesions associated with ST use (Schroeder et al., 1988c). Dental practitioners should actively provide information on ST and initiate early detection and prevention protocols for patients at high risk for ST use. This could include health questions regarding tobacco use, measurement of blood pressure, more thorough identification and detection of lesions, and involvement in tobacco cessation counseling in the office or by referral. To promote these efforts to the dental community, the dental components of two major NCI tobacco use interventions, the Community Intervention Trial for Smoking Cessation (COMMIT, 1988 to 1993) and the American Stop Smoking Intervention Study for Cancer Prevention (ASSIST, 1994 to 1998), provide a framework for the dissemination of oral health and cessation counseling information and the adoption of tobacco-related policies for community organizations (Mecklenburg, 1989).

Because of dentists' prevention-oriented role, exemplified in their effectiveness with using fluorides and reducing dental decay rates, dentists could be an effective force in the prevention and reduction of tobacco use as well. There are more than 140,000 dentists in the United States, who serve most populations and treat more than 70 percent of the total population within any 2-yr interval (e.g., 79 percent of working adults ages 18 to 64, 1985 to 1986) (Mecklenburg, 1989). Dentists have a significant amount of public contact and reinforce other health professional and community activities that are directed toward tobacco prevention and cessation. Dentists also can prescribe nicotine gum or other alternative nicotine delivery therapies for assisting their patients in office-based cessation programs.

For the most part, there has been insufficient education for dental professionals to make them aware of how they can assist in tobacco use prevention and cessation. We do know that, to assist or implement any cessation programs through dental practitioners, the knowledge and receptivity of dental professionals for providing an office intervention for tobacco use must be understood and assessed. Therefore, the current study provides information on the involvement and views of a large population of dentists, representative of Central Ohio, toward ST prevention and cessation activities, as well as the attitudes and barriers among the dental community relative to tobacco knowledge and cessation counseling.

**MATERIALS AND METHODS** A 73-item survey and a computer-readable response sheet were mailed to 1,064 dentists who were Ohio Dental Association members within the Central Ohio area between April and June of 1989. Central Ohio provides a representative sampling from urban, suburban, and rural populations (Table 1). The mailing list for area dentists was obtained from the Ohio Dental Association. Dentists who did not respond within 3 wk were sent a second mailing.

The survey contained items on demographics, knowledge of tobacco, cessation counseling practices, and attitudes about counseling, particularly relative to ST. Prior to the mailing, the survey was pilot-tested with 30 dentists and dental students, with a repeat reliability of  $r=0.73-1.00$ .

The completed response sheets were scanned by computer, and data were tabulated. Data analysis was performed with the Statistical Analysis System (SAS) computer program.

**RESULTS** Responses to the survey were received from 529 dentists (50 percent of the sample). Table 1 provides the demographics of the responding dentists.

Many dentists reported conducting thorough soft tissue exams on all patients (88 percent) and followup visits for those with suspected lesions (82 percent); 82 percent indicated that it was their responsibility to educate the public about ST. However, other questions revealed limited ST counseling practices (Table 2). Although 82 percent believed that it was their responsibility to influence others about ST use, only 44 percent of the dentists discussed the subject of ST cessation during every visit or almost every visit. The most commonly reported method of counseling that dentists would be willing to provide was distribution of pamphlets; very few

Table 1  
**Characteristics of dentists completing the survey**

Characteristic	Percentage (n=529)
Age	
25 to 35 yr	22%
36 to 45	29
46 to 55	19
> 55	29
Gender	
Male	95
Female	5
Race	
White	96
Asian	2
Declined to state	2
Professional Status	
General dentist	85
Specialist	15
Practice Location	
Urban	23
Suburban	53
Rural	24
Smoking Status	
Never smoked	53
Former smoker	39
Current smoker	7
Chewing/Dipping Status	
Never chewed/dipped	91
Former chewer/dipper	7
Current chewer/dipper	2

thought to prescribe nicotine gum, to delegate teaching prevention responsibility, or to refer the patient to an outside cessation program.

Dentists' attitudes (Table 3) may contribute to the current state of reduced counseling practices. Only 9 percent thought themselves effective at getting patients to stop using tobacco, 26 percent forgot to discuss tobacco use, and 23 percent believed they had no time to counsel patients. Many of the responding dentists felt that ST counseling was frustrating and ineffective. Often they believed the tobacco users were not interested, and a few dentists felt that some patients might leave the practice as a result of their counseling efforts. However, the primary inhibitors of the interest in



Table 2  
**Counseling practices**

Statement of Practice	Percentage (n=529)
I bring up quitting or cutting down with patients who chew/dip.	
Every visit/almost every visit	44%
Occasionally	48
Initial visit only	2
Never	3
I have other staff counsel patients about chewing.	
Often or sometimes	36
Never	61
With regard to cessation programs for ST, I would be most willing to:	
Prescribe nicotine-containing gum	6
Provide educational pamphlets on ST	71
Delegate teaching prevention responsibility	3
Refer to outside program	15
None of the above	3
I give pamphlets or educational materials on chewing/dipping.	
Often or sometimes	36
Never	63

ST counseling (Table 3 and Figure 1) were inadequate training in counseling (66 percent) and lack of insurance coverage for cessation counseling (73 percent). However, 68 percent of the dentists stated that they would participate in a continuing education program regarding ST prevention and cessation.

The survey did reveal certain exam-related counseling practices that the dentists offered to their patients (Table 4). A high percentage (82 to 90 percent) of dentists provided thorough soft tissue exams on all patients, conducted followup visits on suspected lesions, and informed their patients about caries, stains, gingivitis, and soft tissue changes caused by ST use. However, only a small percentage of the dentists reported routinely asking questions about tobacco use on health histories (35 percent) or screening for blood pressure (17 percent).

**CONCLUSIONS** Results from this study of ST cessation counseling among Central Ohio dentists were similar to Gerbert and colleagues' study on dentists' attitudes about smoking cessation (Gerbert et al., 1989). Both studies revealed very limited counseling efforts by dentists with regard to tobacco use. Both studies indicate similar reasons for these disappointing results.

In our study, many of the dentists indicated uncertainty toward their role as counselors. Although 82 percent indicated that it was a dentist's responsibility to educate the public about ST, 26 percent reported they forget to discuss it with their patients. This may be attributable, in part, to

Table 3  
**Dentists' attitudes about ST cessation counseling**

Statement	Percentage Who Agree With Statement (n=529)
Counseling against tobacco is frustrating.	66%
Tobacco users will leave practice.	14
I am not interested.	16
It is not covered by insurance.	73
If health insurance paid for counseling, I would spend more time counseling tobacco users to quit.	52
I forget to bring it up.	26
I feel advice is not effective.	36
I feel tobacco users are not interested.	50
I have no time to counsel.	23
I have no training in counseling.	66
I am quite effective at getting patients to stop using tobacco.	9

the perception that ST does not represent a major health risk, for whatever reason, to their patients. Although 93 percent believed cigarette smoking to be very harmful to a smoker's health, only 74 percent believed ST to be very harmful to a user's health. Additionally, many found counseling on tobacco use to be frustrating. A lack of training in counseling was a prime reason for feeling ineffective as cessation counselors. A smaller percentage believed that tobacco users were not interested.

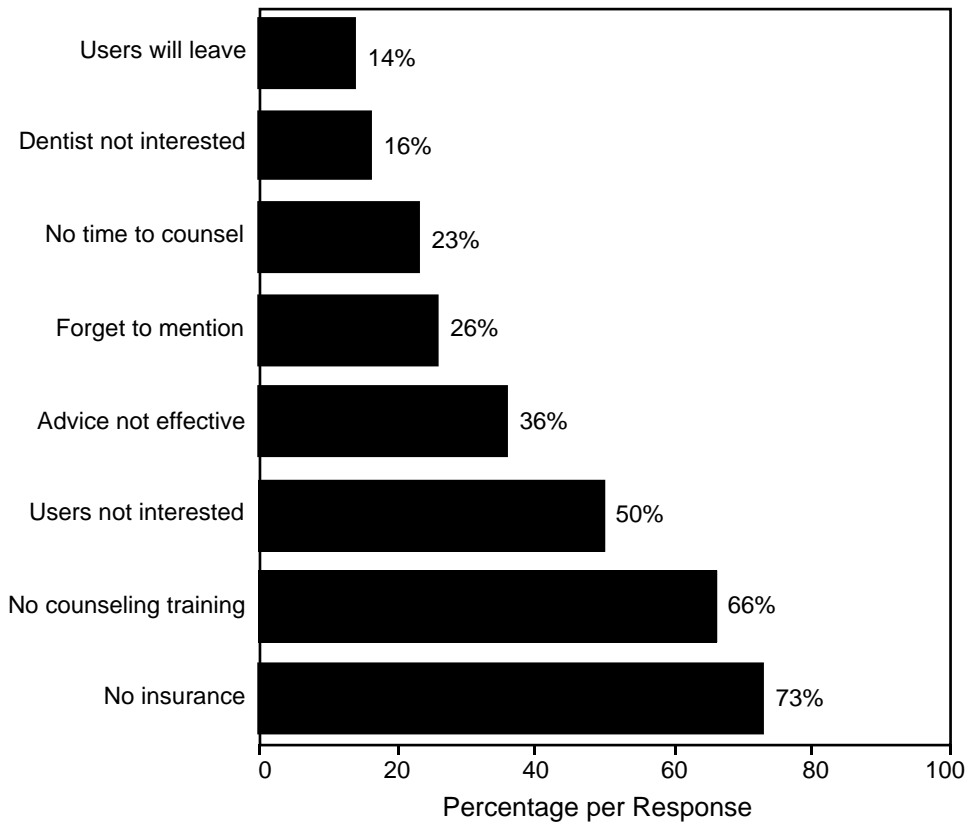
Another major barrier appeared to be a lack of insurance coverage for preventive counseling. Economic incentives through insurance coverage may promote increased counseling and prevention.

Dentists can have a more effective role in counseling patients about ST and smoking. Dentists are "ideally positioned to counsel against the use of cigarettes and smokeless tobacco products." The dental encounter probably constitutes a teachable moment, when the patient is receptive to counseling about lifestyle issues. Past efforts by dentists to prevent oral disease ally them with the preventive health care movement; active counseling in other areas seems an appropriate adjunct. Because many adolescents and adults visit the dentist each year, the dental visit is an excellent opportunity to reach a captive audience (Gerbert et al., 1989; Schroeder, 1989).

The results of this study seem to warrant the following steps:

- *Promotion of counseling courses in dental schools and continuing education*—In our study, 66 percent of the respondents reported inadequate counseling education. Access to counseling courses would enhance the dental practitioners' confidence in their ability to counsel effectively.

Figure 1  
**Dentists' barriers to ST cessation counseling**



- *Promotion of the use of dental staff for cessation counseling*—Dental hygienists and assistants have equal or greater access to the dental patient (Fried and Rubinstein, 1990). Delegation of counseling duties to staff would be cost-effective and result in additional time for other dental procedures by the dentist.
- *Reimbursement for preventive counseling by insurance companies*—Costs for private practitioners continue to escalate because of factors such as infection control and Occupational Safety and Health Administration guidelines. Most practitioners will hesitate to spend time counseling without appropriate remuneration.
- *Marketing all tobacco use as offensive and harmful*—Although education about ST has been increasing, some dentists still view ST as a safe alternative to smoking. This is evident among the participating dentists in the present survey. While 93 percent believed cigarette smoking to be very harmful, fewer believed ST to be very harmful.

Among the indicators of the impact of P.L. 99-252 on decreasing ST use is the presence of curricula on ST. This potential means of evaluation of the impact of the law indicates that the curriculum directors, not only in

Table 4  
Exam-related counseling practices

Practice	Percentage Who Perform Practice (n=529)
I ask specific questions regarding my patients' tobacco habits on health history.	35%
I conduct a thorough soft tissue exam on all patients.	88
I conduct followup visits on suspected initiated lesions.	82
I inform about caries, stains, gingivitis, and soft tissue changes due to ST use.	90
I screen for blood pressure on all patients.	17

primary and secondary education (Chen et al., 1991) but also in dental and medical schools (Fried and Rubinstein-DeVore, 1990; Geboy, 1990; Schroeder, 1990), consider smokeless tobacco, tobacco in general, and programs on cessation counseling of sufficient importance that faculty should include these topics in courses.

This study reveals the importance of addressing tobacco use cessation education in dental schools and dental hygiene programs in the future, and the important role the oral health practitioner can play in controlling tobacco use. The potential for dentists as tobacco cessation counselors and for prescribing of alternative nicotine delivery systems, such as nicotine gum, as an adjunct to their counseling should not be overlooked.

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# An Intervention Study of Tobacco Habits Among Rural Indian Villagers<sup>1</sup>

Mira B. Aghi, P.C. Gupta, F.S. Mehta, and J.J. Pindborg

**ABSTRACT** In a house-to-house screening survey, 36,000 tobacco chewers and smokers were selected from the rural population in three districts of three States in India—Kerala, Andhra, and Gujarat. These individuals were interviewed about their tobacco habits and examined for the presence of precancerous lesions in a baseline survey and then annually over 9 yr. They were educated through personal communication as well as mass media to give up their tobacco habits. The results have indicated consistently that it is possible to induce changes in the tobacco habits of rural populations through educational efforts. This is further substantiated by a significant decrease in the incidence of precancerous lesions. As most cancers in India are reported to be preceded by precancer, this study demonstrates that the primary prevention of oral cancer is feasible, effective, and practicable.

**INTRODUCTION** India is afflicted with the problem of oral cancer. The incidence of oral cancer in India is higher than the incidence of most other cancers (National Cancer Registry, 1988). The relationship between oral cancer and tobacco habits is established as much beyond doubt as the relationship between cigarette smoking and lung cancer, although it may not be as much publicized as the latter. Thus, it appears logical that one way oral cancer can be controlled is through intervention in the tobacco habits of people. The disease can be arrested and cured by treatment, but an epidemic would be impossible to control if tobacco habits were not checked.

As in the case of lung cancer, it is yet not known how much tobacco use would actually result in oral cancer. It seems improbable that such a guideline will be available in the near future. Therefore, it appears that our best bet would be to help people give up the tobacco habit. The primary health care delivery system ought to include such education.

The question then arises: How do we design such a system? Not all forms of health care delivery meet with success. Unless a health care delivery system is designed in consideration of the target population, their habits, beliefs, lifestyles, and knowledge, the system may be ineffective.

The Tata Institute of Fundamental Research has specifically designed delivery of health care services to help people stop their tobacco habits. The communication strategies were developed with the full involvement of the target population. The project study went through two phases before it undertook to intervene in the people's tobacco habits. Phase I was a series of cross-sectional field surveys undertaken to determine the prevalence rates of oral precancerous lesions and their association with tobacco habits. The total population surveyed was more than 155,000 (Bhonsle et al., 1976; Mehta et al., 1969 and 1972). Phase II of the project was a 10-yr followup

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study of 30,000 of the original study population. The results obtained in Phases I and II established that (1) oral cancer and precancerous lesions occurred almost solely among those who smoked or chewed tobacco and (2) oral cancer was almost always preceded by some kind of precancerous lesions (Gupta et al., 1980).

On the basis of these results, an intervention study was launched. The objectives of the study were to make people give up the tobacco habit and to investigate any effect this might have on the incidence and regression rates of precancerous lesions and thus on controlling oral cancer.

In the present study, the intervention efforts have been implemented through a carefully designed comprehensive program in a specifically delineated target population. Every individual in the target population was examined annually to measure changes in the incidence and regression patterns of the disease. The intervention program was carried out by a team of professional dental surgeons and social scientists who were given special training in conducting in-depth interviews, approaching and interacting with the tobacco users in a considerate, sympathetic, warm, and positive manner without condescending in any way.

**MATERIALS AND METHODS** The study population was selected from Ernakulam district in the State of Kerala, Bhavnagar district in the State of Gujarat, and Srikakulam district in the State of Andhra Pradesh. A large

**Study Population** number of individuals were screened, and about 12,000 tobacco users aged 15 and over were selected in each district. The tobacco habits practiced in the study included smoking cigarettes, smoking *bidis*, smoking *chutta* in conventional and reverse manner, and chewing tobacco with or without betel quid (Aghi, 1989).

**Intervention Methods** A program of intervention was developed after appropriate pilot and pretesting surveys. In-depth interviews of the participants were conducted to investigate (1) the reasons for their starting and continuing the tobacco habit (such as when and how the habit started, who encouraged it, was it a peer or a parent?); (2) the perceived implications of the habit in its social, economic, and health aspects; and (3) possible reasons they would give up their habits (Aghi, 1987).

In addition, pilot surveys were conducted to assess the communication media facilities available to the target population that could be used to convey the intervention message. The intervention program outlined a timetable for employing different media of communication and regulating the flow of information so as not to overwhelm the target population. Pilot studies also helped to modify the messages whenever necessary, with a view to making them easily understandable. All this was an ongoing process for every followup.

This paper comprises the results of 10 yr. Each followup used strategies of communicating messages to the target population that assisted and enabled them to give up the tobacco habit. The unique feature of this project has been its user-based philosophy, which is characterized by appropriate input, provided according to the stage of the subject, as follows:



- Knowledge regarding association of tobacco habits and oral cancer was imparted.
- This knowledge was further strengthened by visual reinforcement through flipcharts, posters, films, etc., and a small amount of fear was deliberately induced.
- Knowledge of the health benefits and other advantages of quitting the habit were conveyed; for example, regression of lesions and saving of money.
- Various possible methods of discontinuing the tobacco habit, such as cold turkey, gradual reduction, postponing the first smoke or quid, etc., were described and the most appropriate one for the subject was suggested, depending on the psychological profile of the subject and characteristics of the habit.
- Withdrawal symptoms were explained and emphasis placed on their temporary nature.
- Appropriate praise and reinforcement were given and leadership roles suggested for successful quitters.

**Modes of Communication**

Personal Communication	Personal communication involved one-to-one contact with the target population with a view to helping them sort out doubts and learn behaviors that would result in abstaining from tobacco. The steps in personal communication were worked out in a logical order, recognizing the dynamics of human psychology and what it takes for people to make decisions and change their attitudes and behavior. Certain visual aids were used in the personal communication.
Films	Two films were produced specifically for this phase of the study. The objective of the first film was to give information and create awareness of the relationship between tobacco habits and oral cancer. The objective of the second film was to point out how habits are taken up and developed. In addition, this film presents ways the habits can be given up. Film is a very powerful medium for creating awareness and, when effectively utilized, works to motivate behavior changes.
Posters	Posters were displayed to remind the target population that they ought to be reconsidering their tobacco habits. Two kinds of posters were used, one with a written message only and the other with a visual display along with a written message. Slides were prepared from the posters and were projected in movie theaters in the vicinity to serve the same objective. In addition, handwritten posters summarizing the findings about the particular village were left behind to remind subjects that they had been examined for oral cancer.
Newspaper Articles	Articles were published in newspapers to inform and educate people about oral cancer. It was known that many members of the target population do not read; nevertheless, the articles could be read by some, including schoolchildren, who have been found to be important agents of change in rural India.

**Other Media** There were folk drama enactments with the objective of talking about the prevalent superstitions and misconceptions about tobacco. In addition, radio programs were designed to motivate people to give up their tobacco habits in light of the fact that they might lead to oral cancer. The programs were used to create an environment to help the target population think about their tobacco habits.

**Cessation Camps** In the last two followups, we held cessation camps to address the demand of our target population, who told us that they believed what we said about tobacco being harmful and that they would like to give it up; they wanted to know how to do it. In the cessation camps, detailed discussions were held to suggest the solutions to the problems encountered in discontinuing the tobacco habit. Regular daily followup was maintained for a few days after the camps were held.

**Other Modes** In addition to the above methods, clinics were run to address dental complaints and thereby try to eliminate at least some of the reasons given by users for practicing the habit. Also, exhibits and group meetings were conducted to show common lesions and hold discussions that might help the target population to ask questions and express their feelings and doubts.

**Assessment of Methods** The various methods of communication were assessed individually through carefully designed questionnaire-based sample studies for their impact relative to their objectives. Since all of the communication methods could impinge on an individual's decision to quit or reduce tobacco use, it is hard to ascertain which actually led to the decision. A rank ordering of the various inputs by the target population revealed that subjects have been helped the most by one-to-one interaction; cessation camps had also aided them immensely.

**DISCUSSION** The results of the study have been consistently positive (Table 1). Considering that the target population was not innately motivated to give up tobacco use, it is quite remarkable that such successful results were obtained.

A detailed assessment of the project was made after 1 yr and after 5 yr. After 1 yr, we found that the regression of lesions was significantly higher among those who had stopped or reduced their tobacco use than among individuals who did not do so (Mehta et al., 1982). After 5 yr, it was found that a significantly higher percentage of individuals had stopped and reduced their tobacco use than in the control cohort. As a consequence of this increased stoppage and reduction in tobacco use, the incidence of oral precancerous lesions decreased significantly and substantially in two of the three study areas (Gupta et al., 1986b). Through a multiple logistic regression analysis, it was shown that the intervention efforts definitely helped people stop their tobacco habits (Gupta et al., 1986a).

Some new questions now arise: Where do we go from here? How can this project be used as a takeoff point for intervention at the national level in India?

Table 1  
**The cessation of tobacco use in successive followups**

	Percentage Stopping Tobacco Use		
	Bhavnagar	Ernakulam	Srikakulam
First Followup	4.1%	2.0%	4.9%
Second	7.6	4.4	10.9
Third	10.5	6.4	14.2
Fourth	11.6	7.6	15.4
Fifth	12.5	9.4	16.6
Sixth	14.1	11.2	17.0
Seventh	11.5	11.6	17.3
Eighth	12.2	12.3	17.4
Ninth	12.7	13.1	18.1
Tenth	13.6	14.0	18.8

We have examined the feasibility of training basic health care workers to examine mouths for early detection of both precancerous and cancerous lesions, and we have found this to be possible (Mehta et al., 1986). It would be indeed worthwhile to assess the possibility of training these health personnel to intervene in tobacco habits. If it is possible, the potential is great. Most of the strategies of communication that were utilized effectively in this project are those that involve the mass media or an approach that can be used on a large scale. Undoubtedly, this needs to be validated.

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