A Pilot Study of Smokeless Tobacco in Smoking Cessation

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PURPOSE: The substitution of smokeless tobacco for cigarette smoking is a harm reduction alternative for inveterate smokers and reduces others' passive exposure to smoke. Two million smokers have used smokeless tobacco to quit on their own, but no formal program has employed this method of smoking cessation. We conducted a pilot study to determine if smokeless tobacco could be successfully employed in a smoking cessation program.

PATIENTS AND METHODS: Subjects attended a lecture about the health effects of all forms of tobacco use and about the use of smokeless tobacco as an aid to quit smoking. The study population consisted of 63 evaluable subjects. Follow-up was accomplished by quarterly telephone interviews. Smoking abstinence was confirmed at 1 year by measurement of expired air carbon monoxide.

RESULTS: At 1 year, 31% of men and 19% of women had attained smoking cessation, for an overall success rate of 25%. An additional 7% of subjects had reduced their cigarette consumption by at least 50%.

CONCLUSION: This study suggests that the use of smokeless tobacco warrants evaluation as a potential smoking cessation strategy. **Am J Med. 1998;104:456–458.** ©1998 by Excerpta Medica, Inc.

The Centers for Disease Control and Prevention (CDCP) estimates that there are 46 million smokers in the United States (1). From a health perspective, perhaps the most important subset of smokers are those who are unable to quit despite repeated efforts to do so. The number of these inveterate smokers is unknown but large, as more than 400,000 Americans die each year from smoking-related illnesses (2).

Traditional smoking cessation programs have had limited success and only among smokers who can achieve nicotine abstinence. Inveterate smokers may benefit from strategies that focus instead on providing nicotine by a means other than cigarette smoking. Smokeless tobacco is a potential alternative for inveterate smokers because we have estimated its adverse health effects may be as low as 2% of those of smoking (3,4). In fact, about 2 million persons have used smokeless tobacco on their own to quit smoking (5,6). However, no formal program has evaluated this method. We conducted a pilot study to determine if smokeless tobacco use could be employed successfully in a smoking cessation program.

SUBJECTS AND METHODS

Adult smokers aged 18 and over were recruited through newspaper advertisements over a 6-month period. Criteria for inclusion in the study were any amount of daily cigarette smoking and a desire to quit. Pregnant women and anyone using nicotine substitution therapy were ineligible. The study protocol received approval by the Institutional Review Board for Human Use at the University of Alabama at Birmingham.

At the first telephone contact, subjects were asked to attend a seminar describing a new smoking cessation program. Persons who attended the program completed a questionnaire on demographic characteristics, smoking patterns, and quitting history. Nicotine dependence was assessed by the Fagerstrom Tolerance Questionnaire (FTQ) (7,8). The program consisted of a 20-minute lecture about the health effects of all forms of tobacco use, smokeless tobacco as an aid to quit smoking, and available smokeless tobacco products. A list of other public and private smoking cessation resources was provided. After the lecture, subjects sampled a form of smokeless tobacco available in small pre-portioned single-dose units (Skoal Bandits, US Tobacco Co., Greenwich, Connecticut). This smokeless tobacco product was chosen because it causes little or no spitting and is imperceptible during use. In addition, it was the only single-dose product widely available at the time of the study.

Follow-up consisted of telephone interviews with all participants at 3, 6, 9, and 12 months after enrollment. Smoking cessation was defined as self-reported abstinence for the 4 weeks before contact (ie, point abstinence). Partial cessation was defined as a 50% or greater reduction in the number of cigarettes smoked daily compared with baseline. At the 1-year follow-up, subjects who claimed smoking abstinence using smokeless tobacco were asked to return. Abstinence was evaluated by measuring carbon monoxide (CO) level in expired air, as previously described (9). Carbon monoxide levels were

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Table 1. Characteristics of Program Participants According to Outcome

	Cessation with SLT	Partial Cessation with SLT	Cessation Without SLT	Continued Smoking
Number				
(Total = 63)	16	4	6	37
Age				
Average	47	47	51	46
Range	(31–64)	(44–49)	(37–70)	(30–74)
Gender				
Male	10	0	2	20
Female	6	4	4	17
Nicotine Dependence*				
Average	7.3	6.5	6.2	6.7
Range	(3–10)	(3–8)	(3–10)	(3–10)
Packs per day				
Average	1.5	1.7	1.3	1.5
Range	(0.5–3)	(0.3–3)	(1–2)	(0.5–3)
Years smoked				
Average	28.4	31.5	28.5	25.1
Range	(14–60)	(28–33)	(7–55)	(1.5–48)
Prior quit attempts				
Average	3.9	6	2	3.6
Range	(0–10)	(5–12)	(1–4)	(0–15)
Prior nicotine patch or gum				
Number	14	3	4	24
Percentage	88%	75%	67%	65%

* As assessed by the Fagerstrom Tolerance Questionnaire. For the comparison of the "cessation with SLT" group and all other subjects, t = 1.26, $P = 0.21$.

SLT = smokeless tobacco.

measured by MiniCO carbon monoxide indicator (MSA, Pittsburgh, Pennsylvania), calibrated daily.

For variables of interest, mean values are presented, and the *t* test is used to evaluate statistical significance.

RESULTS

Sixty-five smokers attended seminars. Two subjects died during the follow-up period and are excluded from further analysis. The mean age of the 63 subjects was 46.5 years. There were 31 women (29 white and 2 African-Americans) and 32 men (29 white and 3 African-Americans).

At 1-year follow-up, 31% of men (10 of 32) and 19% of women (6 of 31) had used smokeless tobacco to reach smoking cessation, for an overall success rate of 25% (Table 1). All 16 subjects had expired air CO levels of less than 10 ppm. Nicotine dependence at enrollment was no higher in this group, with an average FTQ score of 7.3 compared with 6.6 among other subjects ($P = 0.21$). Most of these participants previously had tried unsuccessfully to quit smoking with prescription nicotine substitution products, and more than one half had used both the nicotine patch and gum. At enrollment the average cigarette consumption of these successful participants was 1.5 packs per day. Three of the 16 switchers reported abstaining from all forms of tobacco at 1 year. Of the 13 individuals still using smokeless tobacco, the average consumption was 2.3 cans of smokeless tobacco per week (approximately 60 units).

Four subjects (6.7%) had used smokeless tobacco to reduce their cigarette consumption by at least 50% at 1 year. Three individuals in this partial cessation group had previously tried nicotine substitution and 2 had used both the gum and the patch.

Six subjects (9.5%) reported achieving smoking abstinence by another cessation method ("cold turkey," slow taper, nicotine patch therapy). These individuals had the lowest average FTQ score, 6.2, and the fewest prior quit attempts. Four of these subjects had previously tried quitting with prescription nicotine substitution.

Among the 37 subjects who continued to smoke, nicotine dependence was moderate. These smokers had averaged 3.6 prior attempts to quit smoking, and 65% of them had tried prescription nicotine substitution.

DISCUSSION

This pilot study assessed the acceptance by smokers of a novel smoking cessation program based on the substitution of smokeless tobacco for smoking. Of 63 evaluable subjects, 25% used smokeless tobacco to quit smoking entirely and an additional 6.7% reduced their smoking by 50% or more.

This study suggests that smokeless tobacco use is feasible as a quit-smoking strategy. The 16 successful participants in this program were not more dependent on nicotine than were the other subjects, but nearly all had failed repeatedly to quit smoking with prescription nicotine replacement therapy. Therefore, smokeless tobacco may be particularly appropriate for addicted smokers who are unlikely to quit by conventional means. The nicotine patch and gum produce only a slow rise of blood nicotine to levels only one half those produced by cigarette smoking. In contrast, smokeless tobacco use produces peak blood nicotine levels similar to those from smoking (10,11), although it does not produce the arterial bolus of nicotine that occurs when smoke is inhaled. Since the speed and pattern of nicotine uptake may be major determinants of the success of nicotine replacement therapy (10), the nicotine peak provided by smokeless tobacco may help treat inveterate smokers.

It is of interest that 1 in 5 female participants adopted smokeless tobacco. This acceptability probably reflects the fact that newer products can be used discreetly without the degree of social stigma formerly associated with smokeless tobacco use.

The study's major limitations are that, as a pilot study, it was small and had no control group. However, the results justify further evaluation of smokeless tobacco in a larger, randomized, controlled trial.

There have been few innovations in smoking cessation in the past decade (12). Even various forms of nicotine therapy have, at most, doubled the otherwise very low success rates (13,14). All existing cessation strategies require nicotine abstinence; such programs have become labor and resource intensive (15), although they are cost effective compared with other accepted medical interventions. New cost-effective strategies that are available to large numbers of persons are needed for inveterate smokers (16). The results of the program described here compare favorably with existing programs despite our minimal intervention. Smokeless tobacco use carries some risks compared with abstinence, but for inveterate smokers is nevertheless a potential harm reduction strategy that warrants evaluation in a controlled trial.

REFERENCES

1. Centers for Disease Control and Prevention. Cigarette smoking among adults—United States, 1991. *MMWR.* 1993;42:230–233.
2. Centers for Disease Control and Prevention. Cigarette smoking-attributable mortality and years of potential life lost—United States, 1990. *MMWR.* 1993;42:645–649.
3. Rodu B. An alternative approach to smoking control. *Am J Med Sci.* 1994;308:32–34.
4. Rodu B, Cole P. Tobacco-related mortality. *Nature.* 1994;370:184.
5. Centers for Disease Control and Prevention. Use of smokeless tobacco among adults—United States, 1991. *MMWR.* 1993;42:263–266.
6. Tilashalski K, Lozano K, Rodu B. Modified tobacco use as a risk-reduction strategy. *J Psych Drugs.* 1995;27:173–175.
7. Fagerstrom KO, Schneider NG. Measuring nicotine dependence: a review of the Fagerstrom tolerance questionnaire. *J Behav Med.* 1989;12:159–182.
8. Moore BL, Schneider JA, Ryan JJ. Fagerstrom's tolerance questionnaire: clarification of item and scoring ambiguities. *Addict Behav.* 1987;12:67–68.
9. Jarvis MJ, Tunstall-Pedoe H, Feyerabend C, et al. Comparison of tests used to distinguish smokers from nonsmokers. *Am J Public Health.* 1987;77:1435–1438.
10. Henningfield JE, Keenan RM. Nicotine delivery kinetics and abuse liability. *J Consult Clin Psychol.* 1993;61:743–750.
11. Benowitz NL, Porchet H, Sheiner L, Jacob P. Nicotine absorption and cardiovascular effects with smokeless tobacco use: comparison with cigarettes and nicotine gum. *Clin Pharmacol Ther.* 1988;44:23–28.
12. Shiffman S. Smoking cessation treatment: any progress? *J Consult Clin Psychol.* 1993;61:718–722.
13. Russell MAH, Merriman R, Stapleton J, Taylor W. Effect of nicotine chewing gum as an adjunct to general practitioners' advice against smoking. *BMJ.* 1983;287:1782–1785.
14. Pierce JP, Gilpin E, Farkas AJ. Nicotine patch use in the general population: results from the 1993 California tobacco survey. *JNCI.* 1995;87:87–93.
15. Community Intervention Trial for Smoking Cessation (COMMIT), Parts I and II. *Am J Public Health.* 1995;85:183–192;193–200.
16. Perkins KA. Clinical research in smoking cessation. *J Consult Clin Psychol.* 1993;61:715–717.