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Design and Pilot Evaluation of an Internet Spit Tobacco Cessation Program

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Purpose. To develop an interactive Web site to help smokeless tobacco (ST) users to reduce or stop their ST use and pilot test it for feasibility, acceptability, and short-term outcomes.

Methods. An interactive, multiple-contact Internet ST cessation program was developed, refined based on feedback from 17 ST users, and pilot-tested for feasibility, acceptability, and short-term effects on the ST-related behavior and attitudes among baseball athletes attending 3 colleges in California. Consenting ST users completed a baseline questionnaire and enrolled on the Web site for help with stopping ST use. One month later, outcomes were assessed.

Results. Although 18 ST-using baseball athletes enrolled on the Web site, follow-up data were obtained from 12 individuals. Loss to follow-up occurred when we were unable to contact participants by telephone or mailed surveys. At 1-month follow-up, over 80% (N=11) reported that the Web site was: "helpful in stopping or reducing my tobacco use"; easy to navigate; and "appealing." Moreover, 8% (n=1) self-reported abstinence from ST use. Among nonquitters, there was a 26% mean reduction in ST use per day compared to baseline values. In addition, among all enrollees, there was a 4-fold increase in motivation to quit (7% versus 31%) and a 21% increase in their confidence in being able to quit (67% versus. 85%) from baseline to follow-up.

Conclusion. The interactive ST cessation Web site was feasible to implement, acceptable to ST users, and appeared to reduce ST use, enhance motivation to quit, and increase confidence about one's ability to quit. Further study with a larger sample size and a control group is needed to determine efficacy to promote cessation of ST use.

Keywords: Athletes, smokeless tobacco, spit tobacco, tobacco cessation

Introduction

The adverse health effects associated with use of oral snuff and chewing tobacco, also known as spit (smokeless) tobacco (ST) include oral and pharyngeal cancer, oral leukoplakia, periodontal disease, hypertension, and nicotine addiction.^{1,2,3}

ST-associated oral health problems are visually detectable. For example, in one study, 79% of ST users had observable oral leukoplakia, a precancerous lesion, compared to 6% among non-ST users. In addition, among ST users, 85% of oral lesions were in the area where ST was placed.⁴ These oral lesions, when pointed out to users in their own mouths, appear to motivate many ST users to make a quit attempt.^{5,6} They also may serve to reinforce the benefits of cessation since the lesions often heal quickly if the user refrains from ST use for at least 2 weeks.⁷

To date, of the 10 randomized controlled trials of ST cessation treatment reported in the literature,^{5,8,9,10,11,12,13,14,15,16} 5 demonstrated that an oral cancer screening with feedback about ST-related oral problems, cessation advice, self-help materials, and brief counseling by a dental hygienist promoted ST cessation.^{5,8,9,10,11} Thus, the dental hygiene care appointment provides dental hygienists with a "teachable moment" to discuss oral health effects of ST, relate adverse oral changes to ST use, deliver a brief ST cessation intervention, and refer the client to an external ST cessation program for additional assistance with quitting. In clinical settings, tobacco cessation rates have been reported to double when 3 to 4 intervention formats are used in addition to face-to-face counseling.¹⁷ Thus, adding other formats such as a self-help quit guide and referral to a telephone quit line and/or to a tobacco cessation Web site could maximize quitting success. Estimated abstinence rates for self-help and telephone counseling range from 12% to 23% depending on the format used.¹⁹

Although smoking and ST use both involve nicotine addiction, there are several aspects of ST use that are unique from smoking that have implications in cessation efforts. For example, ST users have behavior patterns that indicate heavy dependence on nicotine such as swallowing tobacco juices and keeping a chew in the mouth all day. Also, ST users suffer far less social repercussions and may use ST without others being aware of it. For cessation efforts, this may impact issues such as social support. In addition, the lack of a standard dose, such as a cigarette, complicates efforts to use nicotine fading approaches. Moreover, ST use often is perceived as being harmless and this perception may affect a person's motivation level, or the amount of discomfort a person is willing to tolerate from nicotine withdrawal when trying to stop ST use.²⁰ Thus, quality referral resources external to the dental hygiene care appointment that are dedicated to helping ST users stop their ST use could be valuable resources for dental hygienists to use in assisting clients who use ST with the quitting process.

Review of the Literature

There are numerous studies reporting that tailored computer-based tobacco cessation programs can have significant efficacy.^{19,21,22,23} Tailored programs take into account relevant characteristics of each participant.²⁴ As computing has migrated to the Web, so have computer applications for tobacco cessation. Although Web-based smoking cessation help is widely available on the Web, only recently have studies begun to evaluate Web-based approaches to smoking cessation^{24,25,26,27,28} and even fewer studies have evaluated Web-based ST cessation programs.^{29,30} Lenert and colleagues²⁶ pilot tested online tools for self-monitoring of behaviors and computer tailored e-mail messages timed to participants quit efforts among 49 smokers. Follow-up data were obtained in 26 individuals. Among these individuals, 92% (24) made a serious quit effort, as indicated by quitting for at least 24 hours. The overall quit rate at 30+ days was 18% (n=9). An additional 16% of subjects (n=8) had a 50% or greater drop in cigarette usage, even though they had relapsed. The site, however, was reported to be unable to hold interest since enrollees returned a median of only 2 times, and, on average, completed 2 of 8 modules. Feedback from participants indicated the site was too complex. The design required users to complete a task and follow directions to perform the next activity, which required considerable attention and effort.

Woodruff and colleagues²⁷ pilot-tested a virtual chatroom among 26 high-risk youth attending 6 small, rural alternative high schools using a one-group, before-and-after design. Among the 18 youth who provided complete follow-up data, significant changes were found in the mean amount smoked per day in the past 30 days (4.4 versus 2.4, $p = 0.023$), and mean intention to quit scores (2.0 versus 2.9, $p = 0.038$). They reported that students preferred chat rooms because they were informal and convenient and involved "real time" communication.

More recently, Lenert and colleagues²⁵ evaluated whether an automated e-mail messaging system that sent individually timed educational messages increased the effectiveness of an Internet smoking cessation intervention. They compared 2 Web-based self-help style smoking cessation interventions: a single-point-in-time educational intervention and an enhanced intervention that also sent e-mails timed to participants' quit efforts. Outcomes were compared in 199 participants receiving the one-time intervention and 286 receiving the enhanced intervention with automated e-mail messaging. The 30-day intent-to-treat quit rates were higher in the enhanced group (13.6% versus 7.5%, $p = 0.035$) and appeared to increase the rate at which individuals set quit dates (97% versus 91%, $p = 0.005$) and the rate of reported 24-hour quit efforts (83% versus 54%, $p = 0.001$). They concluded that automated e-mail systems that delivered messages at strategic times are a potentially important component of Internet software systems to promote behavioral change.

Etter²⁴ compared the efficacy of 2 Internet-based, computer-tailored smoking cessation programs in a randomized controlled trial. Visitors to a French-language smoking cessation Web site were randomly assigned to either an original online, interactive smoking cessation program, or to a modified program. Both programs consisted of tailored, personalized counseling letters based on participants' characteristics followed by monthly e-mail reminders. The original program was based on psychological and addiction theory and on preliminary research conducted in the same population. The modified program was shorter and contained more information on nicotine replacement therapy and nicotine dependence, and less information on health risks and coping strategies. The baseline questionnaire was answered by a total of 11 969 current smokers (74%) and former smokers (26%) and the follow-up survey by 4237. The original program was more effective than the modified program in baseline current smokers (abstinence rates: 10.9% versus 8.9%, $P=0.003$).

To date, only one ST cessation Web-based study has been reported^{29,30} wherein an enhanced condition Web-based program (interactive, tailored program) was compared with a basic condition control Web site (static, text-based linear program) on ST cessation rates at 6 weeks, 3 months, and 6 months post-enrollment). Both Web site intervention components were based on Bandura's Social Cognitive Theory^{31,32} (described below). In addition, participants in the enhanced condition received a variety of e-mail prompts during the study for the purpose of intervention, support, or reengagement. Using intention-to-treat analysis, continuous abstinence rates at the 3 and 6 month follow-ups were 11.8% for the enhanced condition and 7.5% for the basic condition. In addition, participants in the enhanced condition made more visits and spent more time accessing their assigned Web site than did participants assigned to the basic condition Web site.

Given the limited research on Web-based ST cessation interventions, we developed an interactive Web site based on the Transtheoretical Model of Change to help ST users stop their ST use. We pilot-tested it for feasibility, acceptability, and short-term outcomes in a sample of ST-using college baseball athletes. The purpose of this paper is to report the results of that pilot evaluation.

Methods and Materials

The pilot study was approved by the Institutional Review Board (IRB) at the Committee on Human Research at the University of California, San Francisco, used one group, before-and-after design, and consisted of 2 Phases. Phase 1 involved Web site development and beta testing; Phase 2 involved pilot testing for feasibility, acceptability, and short-term outcomes among ST-using college baseball athletes.

Phase 1: Development and Beta Testing of the Web site

The Theoretical Underpinnings

The Health Belief Model³⁴ proposes that before taking action to stop ST use, a user must consider it a serious health problem, feel personally susceptible to its adverse health effects, and perceive that stopping ST use will be beneficial. Bandura's Social Learning Theory^{31,32} integrates the cognitive, behavioral, physiological, and social-environmental determinants of behavior change. Bandura's notion of self-efficacy (belief in one's own ability to quit) has proven to be a critical mediator of tobacco use behavior change and maintenance.³⁵

The Transtheoretical Model of Change³³ encompasses the Health Belief Model³⁴ and Social Learning Theory^{31,32} and defines tobacco cessation as a process, involving progress through 5 motivational and behavior change stages: precontemplation (no thought of quitting), contemplation (thinks should quit someday, but not today), preparation (has decided to quit and is taking action to modify his behavior), action (quit in less than a year), and maintenance (quit for a year or more). Self-efficacy, decisional balance variables related to the pros and cons of quitting (including health beliefs), and cognitive-behavioral self-change processes mediate progress through the stages of change. Information on our Web site addressed all 5 stages of change.

Methods

We partnered with A-Frame Software Co. (Sebastopol, Calif) to develop an interactive, multiple-contact, Internet-based ST cessation program. Once the Web site was developed, the database was loaded with simulated test data, tested for functional ability, and changes and fixes were made. We then recruited ST users to complete the Web site program and evaluate it in structured telephone interviews with study investigators. The purpose of the telephone interview was to verify that the design of the site was acceptable to the ST user community and to verify (through the use of independent, nontechnical evaluators) that the site functioned properly.

Subject recruitment for beta testing occurred by posting electronic study information on craigslist, a Web site that provides local classifieds and forums for 450 cities worldwide, and printed study information in college athletic facilities. The recruitment postings had an e-mail address as well as a toll-free number for use in obtaining more study information. Thirty-one individuals gave informed consent to participate and were given the Web site address and a password to log on to the Web site. After completing the Web site program, 17 of the 31 subjects called a 1-800 number to schedule a confidential structured telephone interview with study investigators. As incentive to participate, subjects were offered \$50 upon completion of the telephone interview. Based on feedback from these structured telephone interviews, we refined the Web site and added a Professionally Moderated Message Board and a Virtual Chat Room to provide all ST users with a community forum for peer-to-peer communication and facilitator-led communication.

The final Web site

The final revised Web site (<http://www.spitquit.org>) was operational from December 2004 to October 2006. (The static educational materials on the Web site currently are available for viewing, however, funds are being sought to continue to support the interactive components and to conduct efficacy research.) When fully functional, the Web site was an interactive, multiple-contact, Internet-based ST cessation program, and consisted of online, static, targeted motivational and educational materials, online tools for self-assessment and self-monitoring of behaviors, a professionally-monitored message board, a virtual chatroom, and generated e-mail messages tailored to the ST cessation needs of enrollees to facilitate their quit efforts. Each of the Web site components are briefly described below.

Home page

Initially, participants viewed the main home page of the Web site (Figure 1). The home page and all Web pages offered various options presented as links on a navigational bar on the left side of the page. To the right of the navigational bar on the home page, subjects clicked on the statement that best described them and were automatically linked to a Web page addressing their stage of change or readiness to quit. Clicking on the "I want to quit" link led the participant to a brief, introductory page about the pilot study of the interactive program and the general Web site. Entering the interactive components of the Web site required submission of a consent form to participate in the UCSF study. Once they submitted a consent form they received a password.

Figure 1. Home page of <http://www.spitquit.org>



Although the Web site tracked participants' completion of each module, and sent appropriate e-mails to provide reinforcement and to guide them to the next module, participants had unrestricted access to any module and were allowed to go through the modules at any pace they desired. The navigational bar also allowed users to jump from one activity to another and freely navigate the site.

Self-assessment and self-monitoring tools

After digitally signing the informed consent, and before being prompted to set a quit date, participants completed extensive online assessments of their reasons for quitting, tobacco use history, level of nicotine addiction, previous quit attempts, confidence about the impending quit attempt, concerns about quitting, personal high risk situations (ie, trigger situations when the potential for ST use is high), and patterns of use in a typical day. The latter was assessed via a digital diary. Instructions were provided on how to use the diary to monitor ST use behavior for 3 days to learn how and why one used ST. Participants recorded the time of day they used, the situation, their mood, and rated their craving on a scale of 1-10. Clicking the "Submit" button transmitted the participant's information to the computer server hosting the Spit Quit site. The information was saved to the site's internal database and then instigated the workflow process, which through a series of e-mails, responded to the specific characteristics of the ST user and guided the participant through the quitting program. For example, to build self efficacy for a successful quit attempt, ST users were asked to identify situations in which it would be most difficult to refrain from ST use once they had quit and to plan realistic strategies for coping with these situations. This was done in an effort to break down the potential overwhelming task of quitting into manageable components.

E-mail interactions with enrollees

The interactive e-mail messaging system used an automated "back office" workflow system. This "back office" system consisted of complex statistical programs (unseen by the Web site user, hence the name "back office") that used numerous algorithms to manage protocols for sending tailored e-mail messages as part of the intervention. (See Table 1 for a summary of the e-mail message protocols.) The automated "back office" system ensured that the content of the e-mail messages was tailored to individuals based on their specific characteristics as determined by replies to Web site-based assessment questions, or to previous e-mail messages. For example, the first automated e-mail message congratulated the participant on his decision to stop using ST and asked the question, "Why do you want to quit?" (See Figure 2 for the e-mail message.) Embedded in the e-mail message was an interactive link for him to click on to return to the Web site to respond to our question using a focused assessment tool (Figure 3). Once the participant submitted his reasons for quitting, the workflow program automatically generated a second e-mail thanking him for his response and reinforcing his reasons in an effort to enhance his motivation for quitting (Figure 4).

Figure 2. Text of “What made you decide to quit?” e-mail

Hi John,

Congratulations again on your decision to stop using spit tobacco.

Before we begin suggesting some quit approaches for you to use, we will need to ask you some questions about yourself and your tobacco use. Answers to these questions will be kept confidential and we will use them to tailor a quit program especially for you.

Our first question for you is: Why do you want to quit?

There are many good reasons for quitting spit tobacco (a name we use for dip/snuff or chewing tobacco). Some people quit because of health concerns, to save money, or because someone else wants them to quit. You have to determine your primary motivations for quitting. It is important to consider the health consequences of using smokeless tobacco and the health benefits of quitting to improve the likelihood of success.

Think about your most important reasons for wanting to quit using smokeless tobacco.

You should identify your reasons while your interest in quitting is high. Do it now...while you are still using smokeless tobacco and you are aware of all the problems of your addiction.

After you have been off smokeless for a while, it might be more difficult to remember the bad consequences of using smokeless tobacco. Our minds have a way of remembering good memories and forgetting the negative aspects of smokeless tobacco use. You may start to think about how good it was when you were using smokeless tobacco. If you have all of your reasons for quitting snuff or chewing tobacco written, you will be able to refresh your memory if you have a strong temptation to start using again.

Please click the following link to tell us why you decided to quit.
<http://64.142.11.47:80/wmax/HTMdocs/export/wizard.jsp?key=476a63b7f53c0e7a8361b0bf73ef080b>

Figure 3. Web site linked assessment tool for Participant to use to tell the automated workflow program why he decided to quit

Reasons for Quitting

Reasons for Quitting [Submit my information](#)

What made you decide to quit?

Health
 Family
 Cost
 Spouse/Significant Other
 Taking back control

< BACK CANCEL NEXT >

Figure 4. Text of the thanks for the reasons e-mail

Hi John,

Thank you for letting us know about your reasons for quitting spit tobacco.

Health is a great reason for quitting. As you know, dipping and chewing are associated with oral cancer, gum disease, nicotine addiction, hypertension and risk of dying from heart disease. By quitting your use of spit tobacco, you can take back control of your life and greatly reduce your risk of developing spit tobacco-associated medical problems as well as improve your well-being and quality of life.

Family is a great reason for quitting. Stopping your spit tobacco use will increase your chances of being there for your loved ones in the future and will protect your future health.

Cost is a great reason for quitting. You can save \$200.00 to \$900.00 a year or more by not buying spit tobacco.

Spouse/significant other is a great reason for quitting. Loved ones often urge quitting because they don't want anything bad to happen to you. Stopping your spit tobacco use is one way to show loved ones how much they mean to you and increases the chances that you will be there for them in the future enjoying good health with them.

Taking back control is a great reason for quitting. Spit tobacco users do become addicted to the nicotine in the tobacco. Your body becomes used to the level of nicotine and when you try to quit or cut down, irritability, impatience, anxiety, tension, poor concentration, sleep problems, changes in appetite, and craving are often experienced. Also the longer you use the more you need to use to avoid these signs of withdrawal which begin to control your life. We will work with you to develop a plan that will help you cope with nicotine withdrawal as you go through the quitting process.

Remember all the reasons you want to quit dipping and chewing in the first place. Being firmly aware of and committed to your reasons can help get you through tough situations associated with the quitting process.

Our next question for you is: What are your concerns about quitting?

Please click the following link to tell us about your concerns
<http://64.142.11.47:80/wmax/HTMdocs/export/wizard.jsp?key=476a63b7f53c0e7a8361b0bf73ef080b>

Bye for now.
UCSF SpitQuit Team

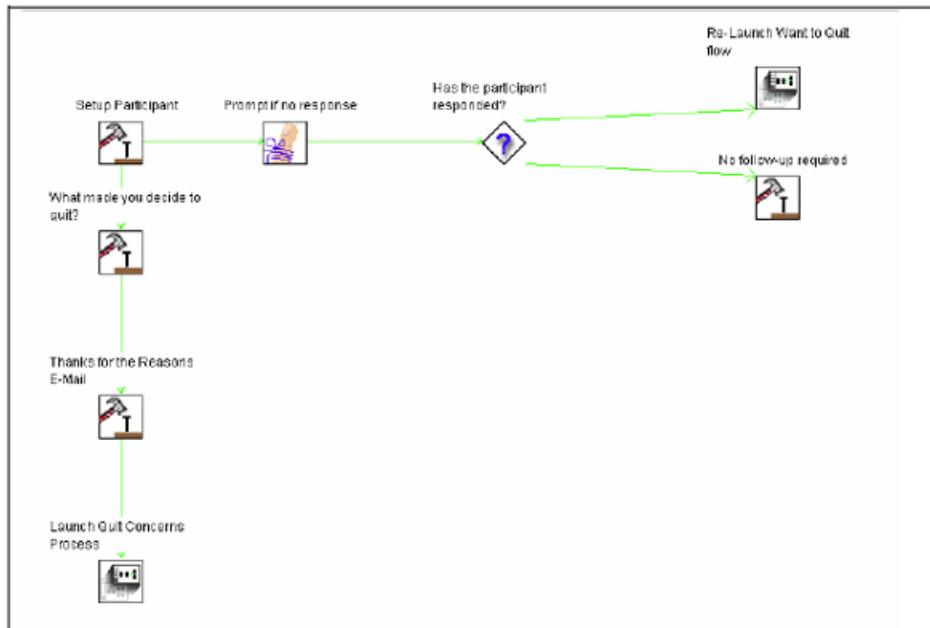
Table 1. Protocol for Sending E-mail Messages as Part of the Intervention*

| Sequence of e-mail messages | E-mail Message |
|-----------------------------|--|
| 1st | Congratulates on the decision to stop using ST and asks "What made you decide to quit?" |
| 2nd | Reinforces reasons for quitting and asks about concerns when thinking about quitting. |
| 3rd | Discusses each concern and asks about history of tobacco use, etc. |
| 4th | Provides summary of assessments and relates results to individual ST cessation needs. Asks to monitor ST use behavior for 3 days by using the Web site diary to learn how and why he uses ST. |
| 5th | Provides feedback on the self-monitoring 3-day diary and relates the relationship of mood, environment, and dependence on nicotine to their ST use. Asks ST user to select a quit date in the next 2-3 weeks and to identify a method of getting ready to quit. |
| 6th | Re-prompt to select a quit date and quit method if no response in 7 days |
| 7th | Acknowledges quit date and quit method and asks to select strategies for dealing with high risk situations. |
| 8th | Reinforces responses to high risk situations. |
| 9th | Quit Day minus 1 day Provides encouragement and asks about coping strategies. |
| 10th | Quit day: Congratulates and asks how it is going. Options on the Web site are: "I have quit"; "I have slipped but still am in quit mode", or "I am still using". |
| 11th | Those who have quit are praised for their accomplishments and referred to coping strategies and information on pharmacotherapy and relapse prevention. |
| 12th | Those who have not quit are asked to tell us where they want to go from here. Web site options are: Continue with my quit attempt without setting a new quit date; Start over – I want to set a new quit date; or, I am not ready to try to quit again. |
| 13th | Those who respond "Continue with my quit attempt without setting a new quit date" are asked then to go back and work with the interactive Webpages on high risk situations. (This interaction will re-launch the strategies for dealing with high risk situations workflow.) |
| 14th | Those who respond "Start over – I want to set a new quit date"; we ask them to click on the interactive link "setting a quit date." (This interaction will re-launch the workflow program to set a quit date.) |
| 15th | Those who respond "I am not ready to try to quit again. Please do not bother me", are dropped from the program with the message "When you are ready try to quit again, we are here to help" |
| 16th | Quit day + 1 day Repeat Steps 11-15, depending on subject response. |
| 17th | Quit day + 3 days Repeat Steps 11-15, depending on subject response. |
| 18th | Quit day + 5 days Repeat Steps 11-15, depending on subject response |
| 19th | Quit day + 7 days Repeat Steps 11-15, depending on subject response |
| 20th | Quit day + 14 days Repeat Steps 11-15, depending on subject response |
| 21st | Quit day + 28 days Repeat Steps 11-15, depending on subject response |

*All e-mail messages had embedded interactive links for the participant to return to specific Web site pages to answer questions. Submitting answers on the Web site triggered the workflow of subsequent e-mails.

Figure 5 provides the diagram of the automatic workflow process for sending the tailored e-mail message related to a participant's reasons for quitting tobacco use. Explanations of the nodes are in the legend below Figure 5. As seen in Figure 5, the "Thanks for the Reasons" e-mail also launched the next step in the workflow, the node labeled "Launch Quit Concerns Process" (see Figures 6 and 7). Figure 8 shows the automatic work flow process associated with asking participants if they have any concerns about quitting. An explanation of each node is in the legend below Figure 8.

Figure 5. A diagram of the automatic setup and reasons for quitting work flow



The node labeled “Setup Participant” represents an internal task that saves the individual participant’s information to the database and links the new workpacket to that individual. The node labeled “What made you decide to quit?” represents the interactive e-mail that is sent to the participant asking what made him decide to quit (Figure 2). The node labeled “Prompt if no response” represents an internal delay in the system that waits for 3 days for a response. After the 3 day wait, the system checks to see if the participant has responded to the question “What made you decide to quit?” This checking process is represented by the node label “Has the participant responded?”. If the participant has not responded, the system re-launches the “What made you decide to quit” process represented by the node label “Re-launch Want to Quit flow”. After another 3-day wait period, if the participant does not respond, then he is automatically dropped from the program. This process is represented by the node labeled “No follow-up required”. If the participant does respond, then the node “Thanks for the Reasons” is activated to send an e-mail and to activate the node “Launch Quit Concerns”. This latter node represents the internal task that prompts the sending of the interactive e-mail to the participant asking, “What are your concerns about quitting?”

Figure 6. Web site-linked assessment tool for participant to use to tell the automated workflow program their concerns about quitting

Figure 7. Text of the thanks for the concerns e-mail

Hi John,

Thank you for letting us know about your concerns regarding quitting.

Being tempted to use tobacco will be strongest in the places where you dipped or chewed the most. As part of developing a quit plan for you we will help you identify those situations, and what you will do instead of dip or chew to help you be prepared and to out think your habit.

Cravings and urges to use, as well as, headaches, irritability, and/or inability to concentrate are common symptoms of nicotine withdrawal. Withdrawal is your body's response when you quit using an addictive drug, such as nicotine. The withdrawal symptoms are signs that your body is cleaning out the nicotine and other chemicals. Withdrawal from nicotine can be uncomfortable, but it is temporary and ill pass. The reward will be worth it. As part of your quit plan we will suggest ways to reduce and to cope with withdrawal symptoms.

It is true that many tobacco users gain weight after quitting. A recent study found that 70% of smokers gained weight in the first month after quitting. The average weight gain reported was 5 pounds. Ten percent of smokers lose weight after quitting, and 20% stay the same. Most weight gain that occurs happens in the first few weeks after quitting. Excessive weight gain after quitting smoking is considered to be 10 pounds. It is probably the result of eating more. Exercise and being careful about what you eat is the best way to avoid gaining weight after quitting. Nicotine gum or patch may help lessen weight gain. As part of your quit plan we will suggest ways to control your weight after quitting.

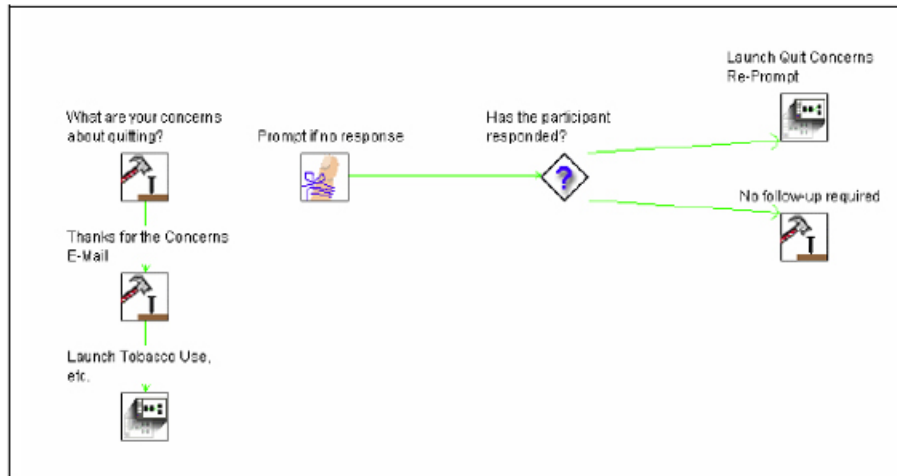
Just because you were not successful before does not mean you can never quit. It is difficult to quit, but it is possible, and you can do it. Quitting dip and chew is a process that takes most people several tries before they make it for good, and most people eventually do quit. Each time you quit, even if it is just for a few days, you learn something new about how to handle it. So the next time, you are better prepared. And remember, you cannot fail by trying.

Please click the following link to tell us about yourself and your tobacco use. This information will help us tailor a quit program just for you.

Please click the following link to tell us about your concerns
<http://64.142.11.47:80/wmax/HTMdocs/export/wizard.jsp?key=476a63b7f53c0e7a8361b0bf73ef080b>

Bye for now.
UCSF SpitQuit Team

Figure 8. A diagram of the automatic quit concerns work flow



The set up node represents an internal task that saves the individual participants information to the database and links the new workpacket to that individual. The node labeled "What are your concerns about quitting?" represents an interactive e-mail that is sent to the participant. The node labeled "prompt if no response" represents an internal delay in the system that waits for 3 days for a response. If there continues to be no response, then the system re-launches the "What are your concerns about quitting?" process represented by the node labeled "Launch Quit Concerns Re-Prompt." After another 3-day wait, if the participant does not respond, then he is automatically dropped from the program. This process is represented by the node labeled "No follow-up required." If the participant does respond, then the "Thanks for the concerns e-mail" node is launched to send an e-mail and to activate the node "Launch tobacco use, etc." This latter node represents the internal task that prompts the interactive e-mails asking the participants to continue the assessment process.

In summary, Figures 5 and 8 are just 2 examples of the automatic workflow programs built into the "back office" of the Web site to execute tailored e-mail protocols listed in Table 1. The salutation in each e-mail was dynamically generated and used the first name information entered by the participant. Submitting requested information triggered the automated back office workflow system to send a tailored e-mail message to the participant. The goal was for the recipient of the message to perceive the message content as applying only to him. The actual message was picked from a large pool of potential responses through an automated process based on specific algorithms. Message content possibilities, however, were designed by study investigators. All messages contained a uniform resource locator (URL) that was embedded in the e-mail message that brought participants back to the Web site with a click of the computer mouse.

Professionally Moderated Message Board

The purpose of the discussion board was to answer questions and offer social support. This discussion board, known as the "STOP Chew Café," was not in synchronized real time, but functioned like a bulletin board to which subjects contributed information, personal comments, and questions. Parties could carry on a dialogue with each other and the moderator with the safety of relative anonymity. The board was checked by study investigators once a day for reviewing and posting of questions and answers. Although study investigators knew who was participating, no real names were used to protect the privacy of participants.

The Virtual Chat Room

The goal of the chat room was to allow participants to interact in "real time" in an Internet-based virtual world with a trained cessation facilitator and other ST-using peers. The facilitator was to use motivational interviewing³⁶ and had the authority to eject athletes temporarily or permanently for inappropriate behavior (eg, making insulting or disrespectful remarks to other participants or the facilitator). The purpose of the chat room was to provide collaborative, participatory problem-solving between the facilitator and participants and among participants themselves.²⁷ Although study investigators

knew who would be participating, no real names were to be used to protect the privacy of participants. Office hours for the virtual chat room sessions were posted.

Static educational materials

The static online educational materials, which could be accessed at any time and downloaded, offered motivational and general information related to stopping ST use. Motivational information covered topics on the benefits of quitting and instruction in oral self-examination procedures to detect visible ST-associated problems (leukoplakia, dental erosion, and receding gums) with photos of what to look for in the mouth. The visible presence of a problem was used to enhance motivation for behavior change and the healing of the oral leukoplakia to reinforce abstinence. Enrollees were instructed that if a lesion was detected, they should stop using ST in that area. If the lesion did not disappear within 2 weeks then they should make an appointment with their dental professional to have it evaluated. If a lesion was not present, individuals were advised to quit ST use in order to avoid potential future lesions.

Other topics covered on static educational Webpages included: basic information about nicotine addiction; ingredients in ST; the importance of making a commitment; the concept of a quit date; ways to get ready to quit; thinking and action strategies to cope with not using ST (eg, repeating coping phrases such as "This urge will pass," "I can do this and I will," and modifying their behavior such as seeking the company of nonusers); the importance of social support, rewards, and oral nontobacco substitutes; withdrawal symptoms and the rationale for and use of various types of pharmacotherapy products as an aid to the quitting process; strategies to cope with temptation to use, and the importance of identifying difficult situations and planning ahead on how to deal with the urge to use ST.

Phase 2: Pilot testing the Interactive Web site

Methods

Overview

Once the Web site was refined based on feedback from beta testing, a pilot study was conducted among a sample of 18 ST-using college baseball athletes in California to evaluate the feasibility, acceptability, and short-term outcomes of the refined Web site on ST-related beliefs and behaviors. ST behavior and attitudes toward quitting were assessed at baseline and at 1-month follow-up. Descriptive summaries of follow-up data were performed to assess acceptability of the Web site and its feasibility of use. In addition, baseline and follow-up values were compared.

Recruitment and Informed Consent

From January to March 2005, we contacted the head certified athletic trainer (ATC) in a convenience sample of 3 colleges to explain the purpose, benefits and risks of the study, to answer questions, to obtain permission to recruit their baseball athletes to participate in the study, and to ask for cooperation in obtaining informed consent, administering the baseline questionnaire, and referring ST users to the study Web site for help with stopping ST use.

All 3 ATCs agreed and were mailed study consent forms, Experimental Subjects Bill of Rights (ESBR), baseline questionnaires, a prepaid, preaddressed Federal Express box for return of study documents, and a standardized training manual for obtaining and returning them to study investigators. In addition, each ATC participated in at least one telephone conversation with the UCSF study coordinator who discussed the training manual content and answered questions about study protocol. Also, each ATC was assigned a secured college log-in password to be given to referred ST users for access to the Web site.

Subsequently, the ATCs attended team meetings of male students at their colleges who had made the varsity or junior varsity baseball teams. At those team meetings, the ATC explained the purpose, benefits and risks of the study, answered questions, and provided a toll-free number of a study investigator. In addition, the ATC assured strict confidentiality, emphasized that participation was voluntary, distributed consent forms and ESBRs, obtained informed consent, and administered the baseline questionnaire to all team members who agreed to participate in the study. Attached to the questionnaire was a face page where name, current and permanent addresses, and telephone numbers were collected from each study participant. To assure confidentiality of responses, the face pages and the questionnaires were coded so that individuals did not put their names directly on the questionnaire. After completing the face page, students were instructed

to separate it from the questionnaire and place the face page in a preaddressed prepaid express mail box placed in the front of the room prior to completing the questionnaire. Further, to ensure confidentiality of questionnaire responses, an envelope was attached to each questionnaire. Students were instructed to seal their completed questionnaires in the envelope and to deposit their sealed envelopes with questionnaires in the preaddressed, prepaid shipping box provided in the front of the room. The last student to complete the questionnaire sealed the box, with the help of the ATC, so that it was ready to mail to the study investigators. The ATC then provided the team with the ST cessation Web site address and the secured college log-in password for access to the Web site.

Eligibility

To be eligible for study participation on the Web site, athletes had to: (1) report ST use within the previous 30 days; (2) be at least 18 years of age; (3) be enrolled in no other tobacco cessation program; and (4) have a California zip code. Eligible athletes agreeing to participate in the study were given the Web site address and the college password to log on to the Web site to complete another consent form and an additional baseline questionnaire; to view interactive Webpages; to receive e-mails; to participate in the virtual chat room and monitored discussion board forums (the Stop Chew Café); and to complete the online 1-month follow-up questionnaire.

Baseline questionnaire measures

The baseline questionnaire assessed the following variables to assess changes from baseline to follow-up values.

Current tobacco use status: Measured by asking the question, "During the past 30 days, on how many days did you smoke: a cigarette? Smoke a cigar?, Use chewing tobacco? Use dip/snuff? There were 7 response options ranging from "none" to "All 30 days".

Number of dips and chews per day: Answered with a number or a zero

Perceived quitting self-efficacy: Measured by asking the question, "If you decided to stop using dip or chew completely during the next 2-3 weeks, how confident are you that you can quit for good?" There were 4 response options ranging from "not at all" to "very confident."

Desire to quit: Measured by the question, "How much do you want to stop using dip/chew?" There were 3 response options: "not at all," "somewhat," and "very much."

Follow-up questionnaire measures

One-month after completion of the Web site program, a follow-up questionnaire was automatically e-mailed to study participants. After 2 weeks, a follow-up e-mail was sent to nonresponders. Two weeks later, nonresponders were contacted by telephone for completion of the follow-up questionnaire. The follow-up variables assessed were:

Gender: measured as either male or female measured as either male or female

Ethnicity: measured with one item with 6 possible response categories: Latino/Hispanic, European American/White, Asian American, African American; American Indian/Alaska Native, Multi-ethnic

Use of pharmacologic adjuncts: Measured by asking the question, "Which of the following, if any, have you used to help you quit using dip or chew? There were 9 response options: nicotine gum, nicotine patch, nicotine nasal spray, nicotine inhaler, nicotine lozenge, Bupropion, group counseling, self-help materials, and other.

Number of dips and chews per day: Answered with a number or a zero.

Perceived quitting self-efficacy: Measure by asking the question, "If you decided to stop using dip or chew completely during the next 2-3 weeks, how confident are you that you can quit for good?" There were 4 response options ranging from "not at all" to "very confident."

Desire to quit: Measured by asking the question, "How much do you want to stop using dip/chew?" There were 3 response options: "not at all," "somewhat," and "very much".

Acceptability of the Web site: Measured with 25 items, each with 4 possible response categories ranging from "Strongly disagree" to "Strongly agree." Items addressed such topics as appeal of the technology, ease of use, satisfaction with e-mail interaction, chat room (Stop Chew Café), message board, helpfulness for quitting, and willingness to refer others to the Web site.

Feasibility of implementing the Web site: Measured by the number of subjects who visited all the components of the Web site and how helpful they found each component with 4 possible response categories ranging from "Not very helpful" to "Extremely helpful."

Abstinence from ST use in the past month: Measured by responding "None" to the question, "During the past 30 days, on how many days did you use chewing tobacco and/or dip/snuff?"

Data Analysis

Descriptive summaries of the data were performed to assess the percentage of respondents who considered various aspects of the Web-based program favorably and who reported visiting the various Web site components to assess acceptability and feasibility of use, respectively. We also evaluated the percentage of enrollees who reported continuous abstinence from ST use in the past month at follow-up. In addition, we evaluated the percentage of enrollees who reported at follow-up a reduction in number of STs per day, an increase in desire to quit, and increase in quitting self-efficacy compare to baseline values.

Results

Although 18 ST-using baseball athletes enrolled on the Web site, follow-up data were obtained from 12 individuals. Loss to follow-up occurred when we were unable to contact participants by telephone and there was no response to mailed surveys or telephone calls.

Most of the subjects were white (67.9%) (n=8) followed by Latino/Hispanic (10.7%) (n=1), African American (7.2%) (n=1), and other (14.2%) (n=2). Respondents had a generally favorable view of the site. Table 2 shows that at 1-month follow-up, 100% of the respondents (n=12) reported that they liked the site and felt like they were receiving personal attention; the Web site was very helpful to people trying to quit dip or chew use; athletes would use the site if they wanted to quit ST use; the flow of information was logical; the e-mail respondents felt like they were receiving personal attention; the monitored bulletin board with support forums was very helpful; the screen responses were consistently fast; and the graphics on the site were acceptable. No subjects, however, participated in the virtual chatroom. Thus, although it was feasible to implement, it apparently was not acceptable to the athletes.

Table 2. Acceptability: Subject Survey Responses at 1-month Follow-up (N=12)

| | % agree/strongly agree | (n) |
|--|------------------------|------|
| <u>Positively Worded Items</u> | | |
| ▪ I liked the e-mail responses. I felt I was receiving personal attention. | 100% | (12) |
| ▪ The flow of information was presented logically. | 100% | (12) |
| ▪ The graphics on this site were acceptable. | 100% | (12) |
| ▪ Screen response was consistently fast. | 100% | (12) |
| ▪ The Web site is very helpful to people trying to quit dip or chew. | 100% | (12) |
| ▪ I think athletes would use this site if they wanted to quit. | 100% | (12) |
| ▪ I liked this site. | 100% | (12) |
| ▪ The monitored bulletin board with support forums was very helpful. | 100% | (12) |
| ▪ The Web site was appealing and made me want to use it. | 92% | (11) |
| ▪ The Web site was helpful to me in stopping or reducing my tobacco use. | 92% | (11) |
| ▪ The Web site was easy to navigate. | 92% | (11) |
| ▪ Information provided by e-mail was useful to me. | 92% | (11) |
| ▪ Screen prompts consistently worked. | 92% | (11) |
| ▪ I found enough information to help me quit dip or chew. | 83% | (10) |
| <u>Negatively Worded Items</u> | | |
| ▪ I would have liked more personal interaction with e-mails. | 42% | (5) |
| ▪ The pace of the e-mails was too slow. | 33% | (4) |
| ▪ More information in each e-mail would be desirable. | 33% | (4) |
| ▪ The Web site was confusing. | 17% | (2) |
| ▪ The Web site moved too slowly in providing me ways to quit. | 17% | (2) |
| ▪ The Web site was frustrating to use. | 8% | (1) |
| ▪ I felt pressured to respond to the e-mails. | 0% | (0) |
| ▪ There was not enough information on the Web site. | 0% | (0) |
| ▪ The pace of the e-mails was too quick. | 0% | (0) |
| ▪ I had difficulty finding information I needed on the Web site. | 0% | (0) |
| ▪ The screen prompts were difficult to understand. | 0% | (0) |

Table 3 suggests that the Web site was feasible to implement since two-thirds of the site's educational components were visited by over half of the participants (n=9). Of those who visited the various components, at least 75% (n=7) found them to be "helpful" or "very helpful" with their quit attempt. Table 4 shows that although at the 1-month follow-up only 8% (n=1) of the subjects self-reported complete abstinence from ST use, there was a 26% mean reduction in ST use per day compared to baseline values among continued ST users. In addition, among all enrollees, there was a 4-fold increase in motivation to quit (7% versus 31%) and a 21% increase in their confidence in being able to quit (67% versus 85%) from baseline to followup.

Table 3. Feasibility of Web site use: Subject use of components and reported helpfulness (N=12)

| | Subjects who visited the component | | Subject who visited that found it helpful/very helpful | |
|--|------------------------------------|------|--|------|
| | % | (n) | % | (n) |
| Benefits of Quitting | 92 | (11) | 91 | (11) |
| E-mail tailored response about concerns | 83 | (10) | 90 | (11) |
| E-mail summary of tailored treatment suggestions | 83 | (10) | 80 | (10) |
| Mouth Problems | 75 | (9) | 100 | (12) |
| Coping with Quitting | 75 | (9) | 78 | (9) |
| Monitor Your Mood | 67 | (8) | 100 | (12) |
| Oral Cancer Self Exam | 67 | (8) | 75 | (9) |
| Helping Someone Quit | 58 | (7) | 100 | (12) |
| 3-day Diary | 58 | (7) | 86 | (10) |
| My Social World | 42 | (5) | 100 | (12) |
| Maintaining Motivation | 42 | (5) | 100 | (12) |
| Stop Chew Café | 33 | (4) | 100 | (12) |

Table 4. Comparison of baseline and follow-up behavior and attitudes (N=12)

| | Baseline | 1 Month Follow-up |
|--|----------|-------------------|
| | IN=18 | IN=12 |
| Mean number of STs per day | 3.9 | 2.9 |
| | % | % |
| Low confidence with regard to being able to quit (not at all/a little) | 33 | 15 |
| High desire to quit (very much) | 7 | 31 |
| No desire to quit | 20 | 0 |
| Tobacco Free | 0 | 8 |

Discussion

The purpose of this pilot study was to develop and pilot test an interactive, multiple-contact Internet ST cessation program. We found that 100% of the respondents reported that they liked the Web site. In addition, at 1-month follow-up, motivation to quit had increased 4-fold, ST use per day decreased, and 8% (n=1) of the participants reported cessation of ST use. Our pilot data suggests that the Web site may have important effects on ST use behaviors, motivation to quit, and on confidence in being able to quit, although more research is needed to determine efficacy.

An effective evidenced-based Internet ST cessation program would be a useful external referral resource for clients identified in the oral health care setting who wish to stop or reduce their ST use. The strengths of a Web-based approach to ST cessation assistance would be the direct access to a high-risk population through referral from oral health care providers, and the elimination of geographic and other access barriers to treatment. The intent is to provide an effective tailored ST cessation intervention at no or very low per participant cost. Only one other study of an Internet-based ST cessation program (ChewFree.com) has been published to date and reported long term ST cessation rates of 11.8% in a sample of 1260 ST users.^{29,30} We selected college baseball athletes to evaluate our Web site because studies have documented

that many male college athletes in the United States are heavy users of ST. Findings from 2 replications of a national study of over 2000 National College Athletic Association (NCAA) athletes at 11 institutions indicate that ST is the only "social" drug out of 4 examined that has been steadily increasing in use across both sexes, all racial/ethnic groups, almost all sports, all NCAA divisions, and all geographical regions. In 2001, prevalence of ST use in the past 30 days reported among male NCAA athletes playing baseball, football, golf, ice hockey, lacrosse, soccer, water polo, and wrestling, ranged from 20% to 40%.³⁷

In 2000, The Public Health Service published an updated Clinical Guideline for the Treatment of Tobacco Use and Dependence¹⁸ in clinical settings. The overarching theme of this Guideline was that healthcare providers should apply the "5-A's Approach" to treatment of tobacco use and dependence in clinical health care settings. The 5-A's Approach is: Ask all clients if they use any form of tobacco; Advise all tobacco users to quit; Assess for willingness to quit; Assist with the quitting process appropriately based on willingness to quit; and Arrange follow-up. Dental hygienists as oral health educators and prevention specialists are well-positioned to apply this 5-A's Approach, especially since they often see clients for multiple appointments per year. Nevertheless, evidence-based referral resources for ST use cessation assistance to augment dental Hygienists' brief counseling are limited. Telephone quit lines provide quality external resources for referral, but not all clients like to talk over the telephone.³⁸ Moreover, it is unclear how effective they are in promoting cessation among ST users who are unique from smokers. An interactive Web site has the potential to reach a large number of college baseball athletes who use ST and to reach other ST users especially if there was an oral health care provider- and athletic-trainer-based referral strategy in place.

The use of online tools for self-monitoring of behaviors and computer-generated e-mail messages tailored to the ST cessation needs of enrollees may have great potential for improving the quality of intervention offered by static Web sites that offer only educational information. Our Web site used workflow programs to prompt participants to follow customized protocols, made branching decisions based on enrollee responses to prompts, and eliminated delays in administration tasks. An important design aspect of the Web site is the spontaneity it allows for skipping from one part of the Web site to another. This approach overcomes the rigid "procedural" style that has been reported to have hampered Web sites dedicated to smoking cessation.²⁶

Surprisingly, however, athletes participating in this study did not participate in any of the virtual chatrooms offered. This finding is inconsistent with reports in the literature that suggest that teens²⁷ and college students³⁹ prefer chat rooms because they are informal and allow participants to interact in "real time" with a trained cessation facilitator and other tobacco-using peers.

When asked about the acceptability of the chat room option, however, several of our subjects mentioned that the scheduled times often competed with other commitments and/or they became distracted with other things and forgot about the chat room availability. Based on our pilot results and the cost associated with personnel to facilitate the chat room experience, we decided to eliminate this component of the Web site.

Several limitations of the present study, however, must be considered when interpreting the present data. First, this study involved a small convenience sample of ST users rather than a large random sample. The small sample size and lack of a control group dictated limited data analysis. Thus, one cannot generalize the results of this pilot study to other ST users.

Another study limitation is that the self-reported ST use in this pilot study was not verified by biochemical assay and may be subject to under- or over-reporting. As anti-tobacco use norms become more pervasive in society, especially in California given its comprehensive tobacco control program, respondents may have been reluctant to admit to continued regular tobacco use. Nevertheless, although it is ideal to validate self-reported smoking status, biochemical validation over the Internet is not feasible.

Finally, our findings are limited by the fact that our study was conducted among college baseball athletes who are at higher risk for ST use compared with the general population. Thus, our results may not apply to the general population of ST users. We chose to work with college baseball athletes due to the high prevalence of ST use reported in this population to maximize exposure of our Web site to as many ST users as possible given limited time and resources. We were surprised, however, to find that the chat rooms scheduled on our Web site were unproductive.

Conclusion

The interactive Web site evaluated in this pilot study was feasible to implement, acceptable to ST users, and promising with regard to promoting cessation of ST use. Further study with a larger sample size and a control group is needed to demonstrate the Web site's efficacy to promote ST cessation. The dental hygiene care appointment provides a unique opportunity to deliver brief ST cessation assistance and then to refer ST-using clients to evidence-based external resources to augment their assistance provided at chairside with ST cessation.

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Notes

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