

Use of Daily Measurement, Standard Celeration Charting, and a Nicotrol Patch to Reduce Cigarette Smoking with a Female College Student: A Case Study

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The purpose of this study was to determine the efficacy of Precision Teaching with daily charting using a Standard Celeration Chart with an adult female college student to reduce her rate of smoking cigarettes. The number of cigarettes smoked per day was measured and graphed in order to provide the participant with feedback as to her daily performance. An ABCD design was used to evaluate the various interventions. The first two procedures were unsuccessful, but the third intervention was the use of Nicotrol Patch, a chemical aide to reduce the chemical craving for nicotine. The patch is designed to be worn 16 hours a day while 15 mg. of nicotine are absorbed through the skin over that period of time. This is employed to reduce any withdrawal symptoms typically associated from the addictive chemical found called nicotine, in cigarettes. The results of wearing the patch were very impressive, bringing the average number of cigarettes per day from 12.5 to 1.0. At the end of formal data collection, the subject was still reporting a desire for cigarettes first thing in the morning and has been able to just smoke one cigarette per day.

Smoking is the leading cause of preventable death, killing over 400,000 people each year and costing as much as 65 billion dollars a year in deaths, lost wages, and smoking-related illness (Leventhal & Cleary, 1980). Cigarettes contain a highly addictive drug called nicotine, but it is only one of many chemicals found in them (American Cancer Society, 1994).

While nicotine is the chemical that addicts persons to cigarettes, the other chemicals are generally what may cause cancers, emphysema, heart disease, and strokes. For example, Pyrene, a main constituent of coal tar is produced when the tobacco is burned. Several other harmful chemicals are produced when cigarettes burn, such as: DDT, a pesticide that has been banned from use; Carbon Monoxide (CO) found in car exhaust; Cresol, used in roach sprays; Ammonia, found in cleaners used to remove wax from floors and varnish; and Hydrogen Cyanide, a fumigation poison banned from international use. In addition, Isoprene, a natural base for tire rubber; Acetone, main ingredient in fingernail polish remover; Methanol, used as rocket fuel; Vinyl Chloride, the main ingredient in the manufacture of PVC; and Arsenic, a poison, are found in tobacco. A shocking fact is that these are only a

few of the chemicals that cause increased heart rate, high blood pressure, increased respiratory rate, restricted blood flow throughout the body, and that all are found when tobacco is ingested (American Cancer Society, 1994).

Once addicted to the drug nicotine, it is often difficult to give up (Lichtenstein, 1982, Shiffman, 1982). However, it can be done and every effort should be made to do so as early as possible. Of course, the best solution is to never start.

An approach that has shown success in reducing the number of cigarettes smoked has been controlled smoking (CS). Controlled smoking is a procedure where persons are taught to smoke cigarettes with low levels of nicotine, smoke just one cigarette per hour, keep their cigarettes in a locked drawer or in the trunk of their car making it effortful to find and smoke cigarettes. Controlled smoking has been a somewhat successful method in reducing the number of cigarettes smoked, as well as the amount of CO ingested by the smoker. The controlled smoking method has suffered from high relapse rates common in most research on addictions (Leventhal & Cleary, 1980).

The purpose of the present case report was to examine the effects of several intervention strategies to reduce the number of cigarettes smoked by a university student. Several strategies suggested by the controlled smoking literature such as smoking in only one place, making cigarettes effortful to locate, and reducing the amount of nicotine ingested by smoking cigarettes low in nicotine. Finally, the use of a nicotine patch was evaluated using daily measurement (Lindsley, 1991). The eventual goal of the research was to have the participant completely smoke-free by the end of data collection.

Method

Participant and Settings

The participant of this study was an adult female undergraduate student enrolled in a private university. The participant is also a parent of a young child. The participant was selected for this particular experiment because of her lack of success with several other treatment plans to stop smoking including hypnosis and various alternative methods such as chewing gum, and a strong personal desire to quit smoking. The participant had smoked cigarettes for more than 20 years and had averaged smoking one pack per day. The settings for data collection and smoking included the participant's home (front porch), on the campus, and when her daughter was not with her, in the participant's automobile.

Movement Cycle and Dependent Variable

The behavior measured was the number of cigarettes smoked per day. Data were collected on the number of cigarettes smoked for seven consecutive weeks.

Experimental Design

An ABCD single case replication design (Kazdin, 1982) was used to evaluate the effectiveness of three different interventions.

Baseline. During baseline, the participant recorded every cigarette she smoked without altering her previous smoking behaviors. The data were recorded on three-cycle graph paper and then transferred to a line graph and to 6-cycle

Standard Celeration Chart. This phase was in effect for 3 days.

Exercise. The first attempt at reducing the amount of cigarettes smoked was to begin a regular exercise program for 20 to 30 minutes for at least three times per week. This phase was in effect for 7 days.

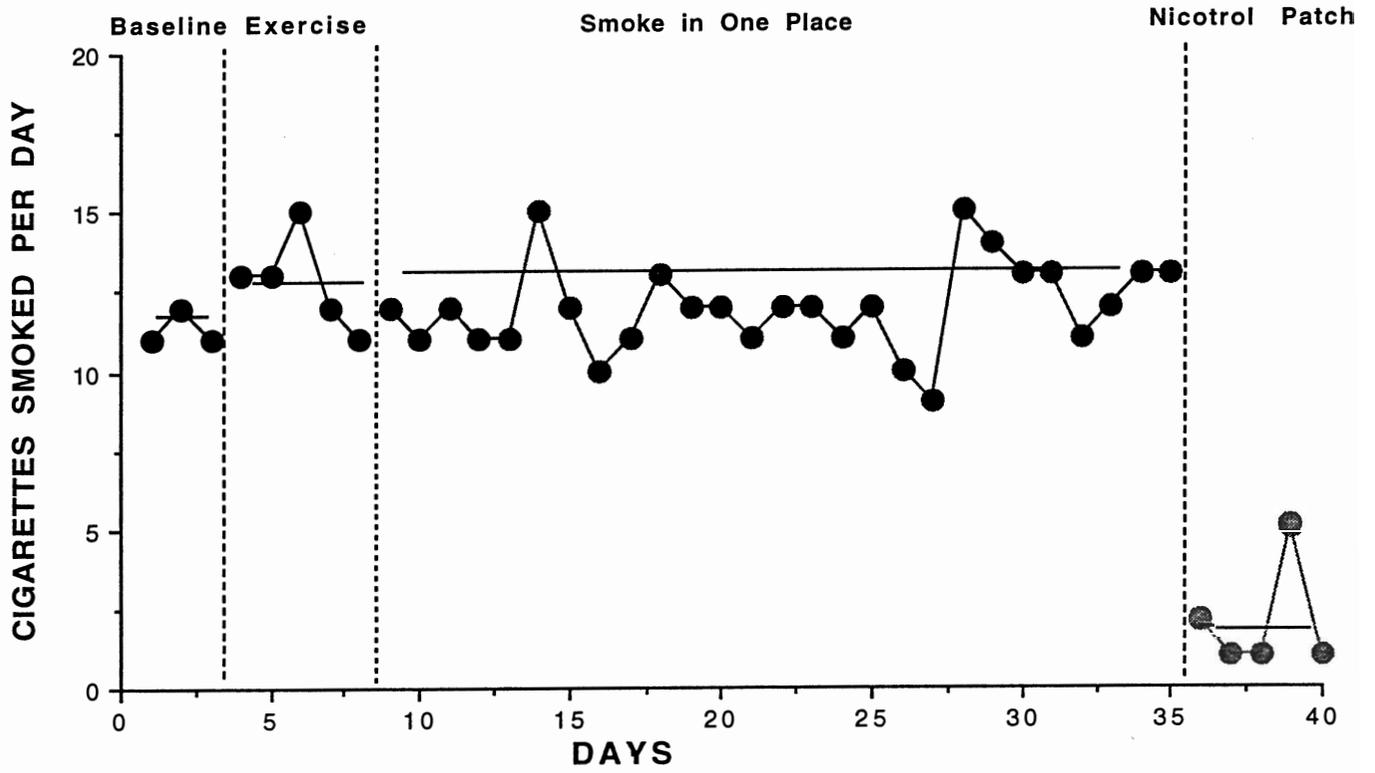
Smoke in one place. Still recording and plotting daily, the subject began to implement a plan to smoke in only one place. The subject chose to do this at her home on her front porch, since she spent so little time at home. This condition was in effect for 26 days.

Nicotrol patch. The subject still recorded her smoking habits daily, and for the third she time tried something different. She went to her physician to get a nicotine supplement in the form of gum. Due to the expense, the participant opted for the Nicotrol Patch. The subject began wearing the patch the following week. Also, the participant smoked a nonpreferred cigarette each morning. This condition was in effect for 7 days and ended the last day of the semester.

Results and Discussion

The results of this study showed a significant decrease in the amount of cigarettes smoked during the implementation of the Nicotrol Patch. A Friedman Two-Way-Analysis of Variance (Siegel, 1956) across phases was calculated. Differences between phases, corrected for ties, were found to be significant ($\chi^2 = 8.7$; $p = .032$).

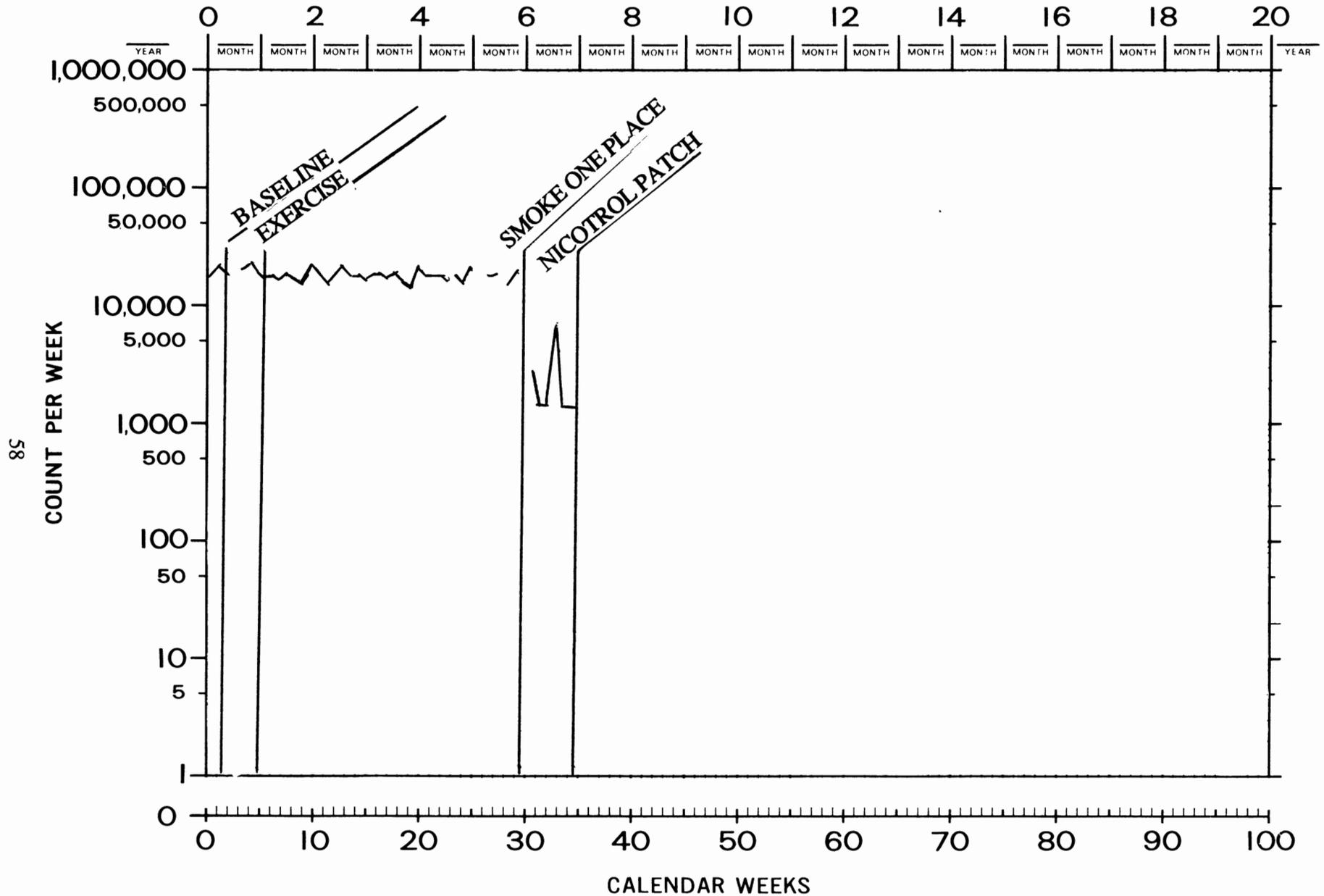
For baseline the number of cigarettes smoked ranged from 11 to 12 with a mean of 11.3. For the exercise program the number of cigarettes smoked remained stable, range 11 to 13 with a mean of 12.85. During the smoke in one place phase, the number of cigarettes smoked daily ranged from 9 to 15 with a mean of 12.5 cigarettes smoked per day. The number of cigarettes smoked per day during the Nicotrol Patch phase was 1.71.





WEEKLY BEHAVIOR CHART (WCM-2EN)
6 CYCLES — 100 WEEKS (20 MONTHS)
BEHAVIOR RESEARCH CO.
BOX 3351 — KANSAS CITY, KANS. 66103

CALENDAR MONTHS



SUPERVISOR

ADVISER

MANAGER

BEHAVIOR

AGE

LABEL

COUNTED

DEPOSITOR

AGENCY

TIMER

COUNTER

CHARTER

The participant in this study had smoked cigarettes for more than 20 years and was actually unsure of her desire to really quit smoking. This may have been largely due to the belief that it was impossible to quit, especially after the several previous attempts at quitting. However, the results of this study show that it can be done. Though the results are not completely satisfactory, they have shown the third intervention to be very effective in greatly reducing the amount of cigarettes smoked each day. The procedure has been effective in the subject believing that she can stop smoking. Considering that the third procedure was implemented one week before college finals and still had a considerable success rate, the subject has considered that during less stressful times, the intervention would have had complete success. The subject has now set a new goal to completely quit smoking cigarettes by the last day of school. A recent check indicated that this goal has not been achieved. However, the student is smoking only one cigarette per day, again providing additional evidence as to the relapse rates in smoking cessation research (Marlatt & Gordon, 1980; Shiffman, 1982).

An implication of this case study is that no matter how long a person has smoked, or how many cigarettes a person smokes, it is quite possible to reduce the number of cigarettes smoked, no matter how hard one has tried to stop smoking and failed in the past. This outcome is supported by the literature on controlled smoking because nicotine was gradually withdrawn, and the participant still consumed some cigarettes (Glasgow et al., 1983). Also, quitting without the assistance of Nicotrol, or some other form nicotine, may not be a wise procedure since relapse rates have been so high.

The use of continuous measurement provided the student with feedback as to the effectiveness of the various interventions. Also, when the smoking in place intervention was not successful, data plotted on Standard Celeration Chart could be used to convince the participant to try another strategy, which in this case, was the Nicotrol Patch.

The use of the patch still allows nicotine to be absorbed into the circulatory system. However, its use does keep the other harmful chemicals such as tars, etc. out of the person's lungs.

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