NICOTINE-CONTAINING CHEWING GUM AS A SUBSTITUTE FOR SMOKING

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A chewing gum containing nicotine has been developed (Fernö, Lundgren and Lichtneckert, 1971). When being chewed, the gum releases its nicotine at a rate judged to be similar to the rate at which nicotine is absorbed during "ordinary" smoking. When this gum is supplied to people who stop smoking they will get the eventual benefit of pharmacological effects of nicotine in combination with "oral occupational therapy". It was therefore decided to try the nicotine gum as part of an anti-smoking treatment. It was realised that some smoking addicts might thus be changed into pure nicotine addicts. This risk was deemed justified to take since there is good evidence that the harmful effects of smoking are largely due to the inhalation of tar constituents and carbon monoxide and not so much due to nicotine.

Our experience so far comprises about 300 subjects, "healthy smokers" as well as smokers with respiratory or cardiovascular diseases. The experience can be divided in 3 parts:-

1. Initial trial, partly on subjects that had relapsed after a "conventional" anti-smoking cure 3 years earlier.
2. Double-blind trial.
3. "Open trial".

During trials 1 and 2 above the patients were given spoken and written information that was not intended to convey positive suggestion. It was thus stated that the chewing gum might reduce desire to smoke, but that its effects appeared to be different in different people. It was also mentioned that the dosage might have to be adjusted initially and that one should therefore not be disappointed if unable to abstain completely during the first 1-2 weeks. The chewing gum was available in three strengths, containing 1, 2 or 4 mg. nicotine. Initially 1 or 2 mg. were used but subsequently we have resorted to 4 mg. as the initial strength in people who smoke more than 20 g. tobacco daily.

The patient received a suitable number of chewing gums and was told to report after one and two weeks. Dosage was then adjusted and further advice given. Thereafter the patients were actively encouraged to stop smoking entirely. They returned at 1, 2, 4 and 6 months after starting the cure, to refill their supply of chewing gum.

The general acceptability was good. The most frequent side effect was sores and blisters in the mouth. This necessitated stopping chewing in one patient and may have contributed to other patients' persistence to smoke. Some smokers with a previous history of peptic ulcer reported recurrence of ulcer symptoms when they changed from smoking to chewing. Several patients using the 4 mg. strength felt some irritation in the back of the mouth and the pharynx, but this irritation was mostly not unpleasant.

In 1966 - 1967 a provisory anti-smoking clinic was arranged at the University Hospital in Lund. After one year more than 80% of those starting the cure had relapsed. Of these patients 51 were subsequently treated with chewing gum (initial trial). The old cure had consisted of 10 visits during 2 weeks. The patients were given methylscopolamine in injections and other forms of heavy suggestion. When the patient had spent enough time on the "chewing gum cure" the two cures were compared as regards the duration and degree of reduction in smoking. In 22 subjects the old cure was better, in 13 the cures were equal and in 16 the new cure was better. This result, albeit disappointing at first, should be evaluated with due consideration of the fact that the old cure involved 10 visits and more persuasion, particularly in the initial stage. Moreover, several smokers as well as an experienced nurse felt that the chewing gum cure offered something which the old cure did not provide. It was accordingly considered worthwhile to set up a double-blind trial. After a preliminary run using 2 mg. chewing gum a main trial with 4 mg. gums was decided upon.

In this trial 50 subjects were studied, 25 were given gums containing 4 mg. of nicotine and 25 were given placebo. As the taste of the two preparations were different in spite of heavy peppermint flavour it was decided to give each subject only one preparation. Subjects who had tasted or could get access to nicotine-containing chewing gums were excluded. In most patients the code was broken after 1 week of treatment. In the others it was broken after 2 weeks. The effect was evaluated from the patient's report on the amount of tobacco and chewing gum consumed and his subjective assessment of the frequency and intensity of the desire to smoke. This assessment was made on a 5-point scale, and noted by the patients on a card every day. In addition CO-hemoglobin was measured on the first, second and third visit. The results are shown in the table.

Table 1 Double-blind trial of chewing gum. Results after one week.
Mean values ± S.E.M. are given.
Active = 4 mg. nicotine 25 subjects
Placebo = No nicotine 25 subjects

	Active	Placebo	Difference
Smoking before g/day	23.8 ± 2.12	23.7 ± 1.145	0.14
Smoking first week g/day	1.6 ± 0.52	3.5 ± 0.90	1.96[x]
CO-Hemoglobin %	1.49± 0.28	2.17± 0.38	0.68
Smoking desire, scale 1-5	3.1	3.1	-
Chewing gums, first week per day	13.5 ± 1.57	13.6 ± 1.76	0.07

[x] t value 1.89, $p<0.05$

In this group of heavy smokers those given nicotine smoked less during the first week than those given placebo. The CO-Hemoglobin concentration was also lower in the smokers given nicotine but the difference from the placebo group is not significant. The number of subjects that had not taken a single puff during the first week was 7 in the active group and 4 in the placebo group.

Unexpectedly, the patients' own assessment of their desire to smoke was the same in both groups and the number of chewing gums consumed were identical in the two groups.

18 subjects in the placebo group were given nicotine after the first week; they tended to reduce their tobacco consumption (and CO-hemoglobin). By contrast, the active group increased smoking slightly in the second week. The differences were not significant, however.

After 8 weeks there were 7 zero-smokers in the active group and 7 in those subjects initially given placebo. The drop-outs were 4 and 8, respectively, in the two groups.

It was concluded that the nicotine content of the chewing gum probably made it easier to stop smoking. However, the mechanism need not be alleviation of abstinence symptoms - at least the patients' own assessment did not suggest this. On the other hand we got the impression that some patients abstained from smoking with remarkably little discomfort.

The results of the chewing gum cure were quite comparable with those of the previous cure, which involved daily visits, injections and positive suggestion. It was therefore decided to use the nicotine gum in a modified anti-smoking treatment, in which the 10 visits of the conventional cure were spread out over 6 months, and with positive suggestion of all sorts. This study is in progress and 6 months' results will be reported at the conference.

Patients with pulmonary symptoms, mainly chronic bronchitis, have shown prompt improvement with disappearance of cough and phlegm in one week. It appears that the use of the nicotine gum is not detrimental as regards pulmonary function. Patients with intermittent claudication, however, have not increased their walking tolerance; this may be due to the persistence of adverse effects of nicotine but this problem must be further analyzed. The results in patients, who have sustained a heart infarction are too few to be evaluated.

There has not been any tendency for patients to increase their nicotine consumption. On the contrary there is a steady "spontaneous" decline both in the number of gums chewed and their strength. Only prolonged observations in large numbers of subjects will show whether the smoker, that has turned into a chewer, will eventually be entirely free of his oral addiction.

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