

## CASE REPORT

# Successful use of nicotine replacement therapy to quit e-cigarettes: lack of treatment protocol highlights need for guidelines

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## Background

The prevalence of electronic nicotine delivery systems (ENDS), such as e-cigarettes and vapor pens, is on the rise around the world [1]. While e-cigarettes may have potential roles in assisting with smoking cessation or tobacco harm reduction [2], they are not currently approved or regulated by the Food and Drug Administration. Although several studies show that use of e-cigarettes is associated with initial reduction in tobacco use [2–4], their safety and long-term efficacy as cessation devices are unknown [4]. The majority of people who use e-cigarettes formerly smoked tobacco cigarettes [5], and many continue to smoke cigarettes while also using ENDS [5], a phenomenon referred to as dual use. The prevalence of dual use suggests that regular e-cigarette use may promote continued tobacco addiction, especially since most of the psychological aspects of cigarette addiction are also operative with e-cigarettes and other ENDS [6]. The potentially addictive nature of e-cigarettes has received little attention in the research literature, and

## Key Clinical Message

Although use of electronic nicotine delivery system devices, such as e-cigarettes and vapor pens, is on the rise, no treatment protocols exist to help such users quit. We report the case of a 24-year-old patient in a tobacco treatment program who successfully quit e-cigarette use by using nicotine replacement therapy.

## Keywords

Cessation, e-cigarettes, nicotine replacement therapy, smoking, vape.

providers who want to help ENDS users discontinue use of these devices need guidance on evidence-based methods. The current report presents the case of an individual who had used an e-cigarette to assist in quitting smoking but found that he was unable to stop e-cigarette use; he entered our program to quit using e-cigarettes. With a combination of behavioral counseling and nicotine replacement therapy (NRT), he became completely tobacco free.

## Case Presentation

A 24-year-old Caucasian male enrolled in a tobacco treatment program with the stated desire to cease using e-cigarettes. He described concerns about his health and fitting in with his social circle, in which smoking and vaping (inhaling vapor from e-cigarettes) were not acceptable. He began “experimenting with cigarettes” around age 17 and smoked 20 cigarettes per day until he was 19, when he quit for 1 year. He resumed smoking at age 20 and then quit for another year at age 22, before

resuming smoking at age 23. He had not used tobacco cessation medications during either of these periods of abstinence from smoking. After starting to smoke tobacco cigarettes again, he began using the e-cigarette at age 24, thinking that this would be a good step toward permanent cessation. He liked the hand-to-mouth activity of both smoking and vaping and felt that vaping helped him relieve work-related stress in the same way that cigarettes did. He started vaping within 30 min of waking and vaped up to 10 times a day, averaging one 16 mg bottle of liquid nicotine per week. By the time he entered the tobacco treatment program, he had quit smoking tobacco cigarettes and had been vaping for approximately 7 months.

## Treatment

The tobacco treatment specialist (TTS) used three indicators, based on the Fagerström scale for nicotine dependence [7], to estimate his e-cigarette dependence level as moderate: number of cigarettes smoked per day (approximately 20) when he smoked tobacco cigarettes, time to first e-cigarette (30 min), and smoking while ill. The TTS initially recommended the daily use of a 14 mg patch, supplemented with 4 mg nicotine lozenges, which he used approximately eight times per day, combined with strategies for behavioral change. After the first week of using both, he reported that he cut his e-cigarette use in half. He discontinued the patch after 1 week because he felt he had no control over its dosing. He continued to use approximately eight nicotine lozenges (4 mg) per day, and he reported 2 days without vaping in weeks 3 and 4. Six weeks into the program, he asked to try 4 mg cinnamon nicotine gum, as cinnamon was his preferred e-cigarette flavor, and he thought the flavor similarity might help him reach his goal. His intuition proved to be correct; before completion of the 12-week program, he had quit using the e-cigarette entirely. He used the NRT intermittently for the next 6 months, at which time he discontinued use. More than a year after quitting e-cigarettes, he remains e-cigarette, tobacco, and nicotine free.

## Discussion

We believe this is the first case reported in the literature of successful abstinence from e-cigarette dependence achieved using recommended evidence-based treatment for tobacco use and dependence [8]. Multiple elements of this report are unique. First, no reliable measure similar to the Fagerström scale for tobacco cigarette dependence exists to assess dependence levels for e-cigarette or dual users. As dual use becomes more prevalent [9], clinicians must have objective guidelines to assess dependence levels

and ascertain appropriate treatment options for such users.

In addition, because no literature exists about using NRT to discontinue ENDS use, one of the biggest challenges involves estimating the equivalent amount of NRT to recommend [10]. NRT works because the patient receives nicotine in an effective, safer, and less addictive form than in cigarettes [11]. This allows the patient to slowly wean off of nicotine. In contrast, ENDS product labels can be misleading, especially with “do-it-yourself” refills [12], and patients’ reports on quantity of nicotine consumption may be inaccurate. Thus, determining appropriate treatment protocols for patients who wish to quit using ENDS can be challenging. At the least, clinicians will need to monitor and quantify, as best as possible, both NRT and any continued ENDS use in order to refine treatment recommendations. Further research and improved protocols are needed to help determine the translation of ENDS use to nicotine absorption.

The effects of flavorings in NRT, and their relationship with flavors the individual might have used in ENDS, also merit further study. In this case, the cinnamon nicotine replacement flavoring – and the ability of the patient to adjust the dose himself – assisted his attempts to quit and led to optimal dosing. The similarity of flavor of the nicotine gum to an e-cigarette flavor that the patient enjoyed helped him be more open to using the gum and may aid others in cessation from e-cigarettes, the majority of which are flavored.

As ENDS and dual use increases, clinicians need clearer guidelines to assist those who wish to quit. These guidelines should include protocols for assessing dependence levels and for recommending treatment options, which could include NRT, other pharmaceutical aids, and behavioral therapy. Such guidelines are necessary to improve outcomes for ENDS and dual users who wish to become nicotine free.

## Conflict of Interest

None declared.

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