Vaping: Is Your Oral Health Worth the Risk?

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INTRODUCTION

Electronic cigarettes (ECs) are battery powered heating devices that can aerosolize an e-liquid creating a vapor, which is then inhaled. This e-liquid is composed of a mixture of propylene glycol and/or vegetable glycerin, flavorings, and nicotine (Martell et al., 2020). This fairly new phenomenon is known as "vaping."

ECs have become popular over the years amongst individuals 18-30 years of age with a recent increase in vapers as young as 15 (Rouabhia, 2020). Most EC users do not view vaping as harmful, but as a "better" and "safer" alternative than conventional smoking (Ralho, et al., 2019). However, that is not the case. The aerosolized liquid in ECs is likely the reason for transforming a vaper's mouth into a dangerous reservoir of diverse foreign bacteria that can cause many oral health issues. Because of this, it is important to discuss your electronic cigarette use with your dental professional. The evidence base of EC risks is still new and growing and there is so much more to learn (Dongxia et al., 2020).

INSIDE THE VAPE

There are no regulations when it comes to the ingredients in your e-cigarette. This means the product may contain a dangerous mixture of chemicals that can create high levels of stress in the microbial community in the oral cavity, which can trigger destructive inflammatory responses (*NewsRx Health & Science*, 2020). Some of these chemicals include:

Propylene glycol: a synthetic, organic compound that is a carrier solvent for nicotine and flavorings. When inhaled, it produces strong throat stimulation and mimics the feel of smoking (Rouabhia, 2020).

Vegetable glycerin: a humectant and also a carrier solvent for nicotine and flavorings. It is thick and sweet and produces those esthetically pleasing clouds of vapor for the e-cigarette (EC) user to exhale. The high viscosity allows the EC aerosols to adhere to the soft and hard tissues in the oral cavity causing oral infections, such as caries (Rouabhia, 2020).

Nicotine: a psychoactive stimulant that may be found in an EC as nicotine salt "juice" (Rouabhia, 2020). Studies have shown that ECs are a better nicotine delivery method than combustible cigarettes. Depending on the severity of exposure, nicotine can cause xerostomia (dry mouth), tooth sensitivity, and nicotine stomatitis (Ralho et al, 2019).

Chemical flavorings: the main reason young people start and continue to use ECs (Rouabhia, 2020). Thousands of flavors have been designed and incorporated into EC liquids, including tobacco, sweet flavors, menthol, and other combinations to render ECs more attractive to users (Rouabhia, 2020). These flavorings are usually supplemented with sucrose and sugar alcohols, which can cause excessive biofilm formation and the adhesion of *Streptococcus mutans* to enamel (Rouabhia, 2020). Enamel exposed to flavored ECs showed decreased hardness, compared with non-flavored ECs (Rouabhia, 2020). These flavorings also may cause oxidative stress and even DNA damage in periodontal cells and tissues (Rouabhia, 2020).

Other ingredients: include ethyl butyrate, hexyl acetate and triacetin (Rouabhia, 2020), nickel, lead, formaldehyde, acetaldehyde, and acrolein (Martell et al, 2020). These ingredients, not only contribute to inflammation in the oral cavity and demineralization of enamel, but may be carcinogenic.

ROLE OF THE DENTAL HYGIENIST

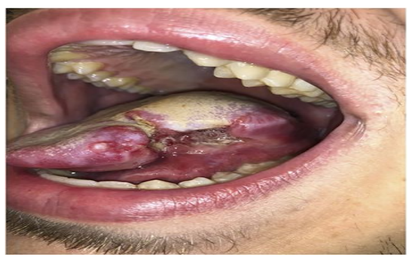
Oral health care professionals have an obligation to provide patients with a valuable education about the risks associated with ECs and come up with ways to help eliminate vaping practices (Ralho et al., 2019). Dental care professionals often ask about smoking status, however they may neglect to ask about non-traditional methods of nicotine consumption, such as ECs (Rouabhia, 2020).

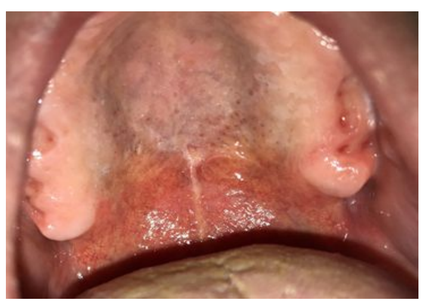
It is imperative for a dental care professional to be up-to-date with the products and habits that may threaten oral health. Gaining that knowledge will guide patients to make the necessary decisions to positively impact their oral health. Providing patients with the correct knowledge of ECs can lead to a reduction or cessation in EC use, thus accomplishing the goal of enhancing the quality of their patients' oral and overall health (Ralho et al., 2019).

EFFECTS ON THE ORAL CAVITY

Switching from cigarettes to vapes does not mean they are a healthier alternative. Here are some of the harmful effects they can have on the oral environment:

- Increase in dental caries: These liquids may contain added sugars, such as sucrose, sucralose, and sugar alcohol (Rouabhia, 2020). These additives enhance the taste and the fragrance. The aerosols produced from this highly viscous liquid can adhere to the tooth's structure and the surrounding soft tissues, causing dental caries (Rouabhia, 2020).
- Adverse effects of the teeth: When an e-cigarette user is introducing this sugar vapor into their oral environment, bacteria use it to thrive and break down the tooth structure (Rouabhia, 2020). In one study conducted, 11.4% of e-cigarette users reported cracked, or broken teeth (Rouabhia, 2020).
- Adverse effects of supporting tissues that include: increased gingival bleeding, increased probing depths, xerostomia, gingival ulcers and lesions, inflammation and proinflammatory cytokines, high plaque index, clinical attachment loss, bone loss, implant failure, certain cancers, and more (Rouabhia, 2020).





DID YOU KNOW

Propylene Glycol, which is in e-liquids, is the same ingredient that is used in antifreeze for your car! (Stratton et al, 2018)

Between 2015 and 2017, there were about 2,035 explosions and burn injuries caused by ECs (Rossheim et al, 2019).

CONCLUSION

Electronic cigarettes are widely available and their popularity has recently increased to around 35 million users worldwide (Martell et al., 2020). What started out as a smoking cessation device has turned into a socially acceptable recreational activity – especially among young people (Martell et al., 2020). Evidence regarding the full extent of damage caused by ECs in the oral cavity (and the rest of your body) is limited, but scientists do know that plaque biofilm in the oral cavity of vapers is teeming with potent infection-causing organisms that put vape users at substantial risk for a wide range of ailments – from periodontitis to cancer. Vaping is a major assault on the oral environment and these harmful changes can happen dramatically and quickly (*NewsRx Health & Science*, 2020).

We owe it to our patients to initiate a dialogue with them about the negative effects of vaping and help them find ways to cut down or quit. ECs can be very addictive and cessation products such as gum, transdermal patches, nasal sprays, inhalers, and sublingual tablets and lozenges might be helpful in kicking the habit (Rouabhia, 2020).

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