

The Impact of Electronic Cigarettes on General Oral Health
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Electronic cigarettes have taken over modern times. Vapes are no longer limited to the younger generation. Old-school tobacco has more of a negative association than ever before, bolstering the popularity of smokeless tobacco devices. The question for many healthcare professionals is what are the effects on patients? Very little scientific literature is available compared to traditional cigarettes. This paper intends to discover the implications of smokeless tobacco for oral health. What has scientific literature unearthed so far? Is it truly better than cigarettes? The e-cig industry claims to be healthier, safer, and more efficient than its older brother tobacco, but how true is this statement?

Similar to cigarettes, e-cigs are composed of many more ingredients than just nicotine. The “secret sauce” being the aforementioned nicotine is what gets patrons addicted, in turn lining the pockets of tobacco execs. Every brand of vape differs from one another. The percentage of nicotine, flavor, and chemicals used for vaporization may differ. Some examples are menthol, or fruit flavors, while they can use glycerin and propylene glycol for vaporization. Each of these chemical components has an impact on enamel, oral mucosa, and overall patient health. This paper will examine three scientific studies where different effects on oral health are observed. First, an increase in altered bacteria within the oral microbiome. Second, an increase in biofilm formation and adhesion. Third, the impact of enamel color on chemicals within vaping devices.

Beginning with the oral microbiome, eighteen vapers and eighteen non-vapers were studied to analyze the impact of vaping on oral health. Vapers exhibited an increase in *Veillonella* bacteria, a strain that has not even been properly classed as of yet (Yang, 2022). This presents a challenge for both patients and hygienists. We may control an increase in bacteria with routine

cleaning and proper at-home care. But what is the correct treatment protocol for bacteria that we do not fully understand? New bacteria formed from vaping could be resistant to certain ingredients, such as fluoride. More research needs to be conducted for clinicians to understand how to educate their patients. The easiest and most effective treatment protocol remains to quit both traditional tobacco along with vaping.

Proceeding with biofilm formation and adhesion, a study looked at vaping's impact on *Streptococcus mutans*. The aforementioned bacteria is a significant factor in tooth decay. They exposed the bacterial strain to cigarette smoke, along with e-cig vapor, some containing nicotine and some without. After six exposures to nicotine-rich vapor, the scientists observed an increase in both biofilm growth and adhesion (Rouabhia, 2021). This piece of scientific literature is helpful regarding patient education. The general perception of e-cigarettes is that there is no negative impact on oral health, however, this study shows exactly how vaporized nicotine impacts the oral microbiome. Patients who vape still need to be just as vigilant as traditional smokers, keeping up with routine cleanings, along with thorough at-home care.

Moving forward, electronic cigarettes have now been shown to affect enamel color. Sixty-three bovine enamel specimens were treated with different aerosols. These aerosols contained different amounts of nicotine and flavorings. A spectrophotometer was utilized afterward to record observations in enamel color. After twenty cycles of aerosol exposure, enamel luminosity was reduced. The amount of nicotine contained within the vapor did not appear to impact the effect. The scientists noted that flavored vapor caused the biggest change in the enamel's color (Pintado-Palomino, 2019). While most patients smoking and or vaping may

not care to know this information, it is still helpful. A clinician would be able to explain why a patient's enamel is dull and discolored, even if they have never smoked traditional tobacco before.

Pushing ahead, the importance of smoking counseling during dental visits is beneficial to all parties. Scientific literature has already shown how cigarettes increase plaque build-up, raise blood pressure, clogged arteries, and damage internal organs. As we conduct more studies on electronic cigarettes, we are starting to see their impact on oral health. A teenager who just started vaping may think they have absolutely nothing to worry about. We now know that biofilm production and adhesion have increased even in vaping. Enamel color is at risk of changing, and it can alter the oral microbiome to a state we do not know how to treat yet. By educating the patient, they can make their own decision armed with the knowledge we have acquired.

In contrast, a patient who has been smoking for twelve years and is in their thirties might require a different approach. While clinicians can still educate their patients, they might be content with their habits. In this case, vaping is still a less harmful choice than cigarettes. As they continue to age, their overall health, along with oral, will be less at risk vaping than smoking traditional tobacco. Neither is ideal for the gold standard of health, however, as clinicians, we must also take into account the real world. Not everything can be ideal. We are treating humans, after all. Emotions and life inevitably creep into all aspects of life, including oral health.

In conclusion, this paper educated me on the impact of electronic cigarettes on oral health. Having been a smoker, and then transitioning to vaping, I only knew the effects on my general health. Even then, those were subjective observations I made myself, along with my annual physical, which showed slightly elevated blood pressure. In the past, I never would have been able to tell anyone why vaping may harm oral health. I can now confidently educate patients on how it affects teeth in several ways! As time moves on, more scientific literature will come out focusing on vaping and its effect on our health. But for the time being, I feel confident that I can use my newfound knowledge to help my future patients make the best choice for their health!

References

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