

The Effect of Electric Cigarette Smoking, do we have Enough Evidence?

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Abstract

Tobacco smoking is a risk factor for patient's medical and dental health including periodontal health. Studies showed more severe periodontal diseases in cigarette smoking (CS) group compared to former or non-smokers. In the past few years, electric cigarettes (EC) became more socially accepted as a safer alternative to tobacco smoking. Further, smokers are using electronic cigarettes as a smoking cessation aid without any scientific evidence to support it. The public notion that these products exhibit no harm is dangerous and misleading. Therefore the current review aimed to evaluate the effects of EC on systemic, oral and periodontal health.

Keywords: Cigarette Smoking (CS); Electric Cigarettes (EC); Tobacco Smoking

Introduction

Tobacco smoking is a risk factor for multiple medical conditions including periodontal disease [1]. Smokers have more severe periodontal disease compared to former or non-smokers [2]. The exact mechanism behind the negative effect of smoking on periodontium was extensively discussed in Literature. The studies cite a negative impact of smoking on the periodontium at the microbiological, clinical, and immune system levels. At the microbiological levels, smoking leads to changes in subgingival microflora [3-5]. At the clinical level, it modifies the plaque index [6,7], bleeding index [8,9], bone and attachment loss [8] and gingival recession [10]. With regard to clinical parameters, smokers were found to have deeper mean probing depth [11-13] increased gingival recession and attachment loss [14]. Cigarette smoking is associated with two- to eight-fold increase in risk for attachment and/or bone loss [15]. The relationship between smoking and periodontitis is a dose-dependent one where heavier smokers have increased incidence of disease compared to light smokers [2]. The aforementioned changes are a result of the altered response to periodontal therapy as smoking affects neutrophil and fibroblast functions, which in turn may have a negative impact on periodontal wound healing.

Electric cigarettes (EC)

Recently, (EC) are becoming a more socially accepted alternative to tobacco smoking [16,17]. Approximately 40.2% of Americans are aware of EC with high usage among current smokers. Moreover, current college students prefer ES over CS as of common notion of being a safer alternative to tobacco smoking [18,19]. The number of EC users has increased from 4.7% in 2011 to 10% in 2012. The students who reported that they have never smoked traditional CS were 7.2%, while 80.5% of them use both EC and CS [20]. It was also reported by the US Surgeon General in 2012 stated that each day 3,800 teenagers under 18 smoke their first cigarette and more than 1,000 teenagers become cigarette smokers [21]. Lack of FDA regulations and age restrictions on selling of EC is intimidating and it may lead to a new generation of nicotine and tobacco addicts [21] and an obstacle to conduct high-quality research.

Environmental Effect

EC may have a negative effect on the environment and systemic health. The negative impact of EC on the environment (i.e. secondary or tertiary smoking) is not yet clear, due to weak scientific evidence [21,22]. Well-designed controlled clinical trials are necessary to examine the influence of EC on the environment. It was reported that EC vapor remnant may be associated with secondary or tertiary smoking [23]. However, these results were contradicted by McAuley, *et al.* 2012 as he concluded that the byproducts of EC has a minimal amount of pollutants compared to CS [24].

Systemic Effect

There is inconclusive evidence regarding the negative effect of EC on systemic health as well compared to CS [24]. Vansickel, *et al.* 2010 found that EC users had minimal levels of nicotine compared to CS with no effect on heart rate [25]. On the contrary, Eissenberg reported that nicotine dosage is variable in EC where it exceeds CS implying a more negative effect [26].

Oral Cavity

The system effect may involve the whole body with more prominent changes within the oral cavity. Polosa, *et al.* 2011 evaluated the adverse oral effects of EC. He concluded that 6% of patients experienced mouth irritation, 8% sore throat and dry mouth and 9% mouth ulcers after 4 weeks. Further, 8% reported a dry cough after 8 weeks and 8% complained of throat irritation and 7% had dry mouth after 24 weeks [27]. Therefore, the incidence of adverse oral effects was small, but it shows that EC use may cause negative effects on the oral cavity. The effect of EC on periodontal diseases and healing has not been researched. More study is needed in order to identify the long-term effects of EC in oral health.

Clinical Application

Dental practitioners should be aware of Electric Cigarettes and their use among the patients and routinely ask their patients for any history of EC use as part of tobacco use/smoking history. Presently, EC is not approved as a smoking cessation aid by the FDA. Dental practitioners need to educate their patients on this lack of evidence related to EC. Also, should continue to prompt smoking cessation through evidence-based methods, such as counseling and medications.

Conclusion

There is inconclusive evidence regarding the negative effect of EC on systemic health compared to CS. There is no strong evidence to properly evaluate and assess the negative effect of electronic cigarettes on the periodontium. More studies need to be conducted in order to assess the effects of EC on systemic health and oral health.

Conflict of Interest and Source of Funding Statement

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