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Electronic nicotine delivery systems: vaping away gum tissue

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Electronic nicotine delivery systems: vaping away gum tissue
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Abstract

Objective: Conventional cigarette smoke has shown deleterious effects on immune cells and wound healing in the periodontium, but little is known about the comparative effects of electronic nicotine delivery systems (ENDS). If current conventional cigarette users are to transition to e-cigarettes, the evidence must demonstrate if electronic nicotine delivery systems can be deemed safer to the periodontium than conventional systems.

Methods: The PubMed and CINAHL databases were utilized to find current scientific evidence regarding the use of ENDS and the periodontium. Risk of study bias was assessed using the Effective Public Health Practice Project (EPHPP) framework. 25 articles were summarized to write this review of literature. In this study, 25 articles published from 2015 to present were reviewed. Background information about ENDS was also included in this review.

Results: ENDS have been shown to contribute to several pathophysiological effects including oxidative stress, inflammation, apoptosis, and fibrosis of the oral submucosa. ENDS vapor, especially with flavoring chemicals, has been shown to have destructive effects on periodontal ligament fibroblasts, thereby reducing normal osteogenesis. 1-6

Conclusion: ENDS are emerging, and studies are difficult to complete due to participants smoking in multiple forms of smoking. Although individual studies have been published pertaining to ENDS use, future studies will aid in assisting public health officials and healthcare providers to deliver the appropriate message about ENDS safety and will serve as a guide for future regulatory measures.

Introduction

Electronic nicotine delivery systems (ENDS) are devices capable of converting a liquid mixture containing flavoring and concentrated nicotine into a vapor which is inhaled. ENDS vapor is comprised of several compounds and ingredients have been placed on an FDA list of “harmful and potentially harmful constituents (HPHCs).” The release of the cytokines and components and ingredients have been placed on an FDA list of “harmful and potentially harmful constituents (HPHCs).” ENDS vapor, induce cytokine/protein stress, resulting in an increase in the severity of chronic inflammation. These molecules and their effect on periodontal ligament fibroblasts to release detrimental levels of inflammatory cytokines, TNF-α and IL-1β. A dysregulated tissue concentration of these cytokines contributes to alveolar bone resorption and tissue degradation. Levels of TNF-α and IL-1β were found to be increased after using flavored vapor. The release of cytokines and components and ingredients have been placed on an FDA list of “harmful and potentially harmful constituents (HPHCs).”

What Is In ENDS Vapor?

ENDS vapor is comprised of several compounds and ingredients have been placed on an FDA list of “harmful and potentially harmful constituents (HPHCs).” The studies performed in the future should set in motion public health officials and healthcare providers to deliver the appropriate message about ENDS safety and will serve as a guide for future regulatory measures.

Discussion

Information and Anecdotal Story: A user, Rachel, found in her flavored ENDS vapor, induce cytokine/protein stress, resulting in an increase in the severity of chronic inflammation. These molecules and their effect on periodontal ligament fibroblasts to release detrimental levels of inflammatory cytokines, TNF-α and IL-1β. A dysregulated tissue concentration of these cytokines contributes to alveolar bone resorption and tissue degradation. Levels of TNF-α and IL-1β were found to be increased after using flavored vapor. The release of cytokines and components and ingredients have been placed on an FDA list of “harmful and potentially harmful constituents (HPHCs).” The metal alloys in ENDS units can be exposed to high levels of heat and voltage, resulting in an increase in heavy metal exposure in ENDS users. The studies performed in the future should set in motion public health officials and healthcare providers to deliver the appropriate message about ENDS safety and will serve as a guide for future regulatory measures.

Conclusion

• ENDS vapor, especially with flavoring chemicals, has been shown to contribute to the pathogenesis of periodontal disease
• Nicotine intake can be greater with ENDS than conventional cigarettes and can negatively affect the user’s gingival epithelial cells, periodontal ligament cells, and osseous tissue
• Exposure to heavy metals can be greater in ENDS than conventional cigarettes and has negative consequences for the periodontium.

Future Research

• The studies featured in this review were not performed over long periods of time and the authors recommend future longitudinal studies be performed to strengthen the body of evidence focusing on ENDS use and the effects on the periodontium.
• There are limited studies focusing on the association between exposure to heavy metals and periodontitis, and more studies are warranted.

References

[8] Thieleman, Denise, BS; Tulloch, Christina, BS 1