

# ***The Effects of Tobacco Exposure on Taste and Pain Perception in the Mouth: A Review and Prospective Study***

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## **Abstract**

**Background:** The ability to perceive oral sensations is a crucial determinant of lifestyle and dietary choices. Health complications can emerge when the cranial nerves responsible for these senses are damaged, leading to alterations in sensory perception. Causes of nerve damage range from illnesses and trauma to the head, and exposures to toxic substances such as tobacco. While sensory perception has been extensively studied, there is an insufficient amount of widely agreed upon data for the direct effects of smoking on the quality of taste and pain perception.

**Objectives:** (1) This literature review explores prominent studies on the effects of tobacco use concerning taste and pain perception. (2) Introduces a prospective study on the unconfirmed cranial interactions associated with taste and pain perceptions under the influence of dental anesthesia.

**Methods and Results:** An extensive online search was conducted using PubMed. The search strategy involved queries with these key concepts: “taste,” “pain,” “smoking,” “tobacco,” “nicotine,” “PTC,” “TAS2R38,” and “electrogustometry.” Results were sorted by most recent dates and yielded 607 items. However, only 21 articles were selected for further review based on the inclusion criteria: (1) access to full-text articles and (2) scope of focus included at least “taste” and “smoking.”

**Discussion:** Two common themes emerged from the literature: genetics and anatomy. The genetic aspect described the polymorphism of the TAS2R38 gene, which codes for a human bitter taste receptor. Smokers were more likely to be recessive for the gene compared to non-smokers, suggesting that genotype could predict smoking susceptibility. Concerning oral anatomy, studies gave evidence for morphological changes due to smoking and discussed the implications on taste. Electrogustometry was a recurring technique used to evaluate taste thresholds; however, this method is questionable in that it only accounts for sour taste.

**Conclusion:** The final number of articles used illustrates the shortage of data for the effects of tobacco on taste and pain. Current literature suggests that smoking has an anatomical impact on taste and that taste can explain tobacco use on a genetic level. However, definitive conclusions could not be made on the extent in which tobacco affects the range and overall quality of taste and pain perception. As such, a study has been planned to investigate the uncertainty.

## **Competencies:**

### **Master of Public Health Competencies Strengthened**

- Monitoring health status to identify and solve community health
- Diagnosing and investigating health problems using an ecological framework
- Informing, educating, and empowering people about health issues
- Developing plans that support individual and community health efforts
- Using laws and regulations that protect health and ensure safety
- Linking people to needed personal health services and assure the provision of health care when otherwise unavailable
- Conducting research for new insights and innovative solutions to health problems
- Communicating effectively with public health constituencies in oral and written forms

### **Environmental Health Concentration Competencies Strengthened**

- Describe to specific communities or general populations the direct and indirect human and ecological effects of major environmental agents
- Describe genetic, physiological and psychosocial factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards.
- Explain the health effects and general mechanisms of toxicity in eliciting a toxic response to exposure to various environmental toxicants.
- Specify approaches for assessing, preventing, and controlling environmental hazards that pose risks to human health and the environment.

## **Public Health Relevance**

Any gaps in health information are public health concerns, and currently, data for the effects of tobacco on taste and pain perception is scarce. However, unraveling the complexities of oral sensation could shed light on a multitude of health issues that stem from oral health.

The findings of this study could further advance the fields of science and health with a more thorough physiological background and possibly clarify any misgivings in existing literature. By supplementing and improving information on pain and discomforts in the mouth, oral and general health practitioners can modify their methods of care appropriately. Similarly, the results of the pilot study could help resolve situations where patients complain of dental pain in areas where care has not been provided, and could potentially reduce the number of unwarranted malpractice claims.