

Science brief on alcohol-containing mouthrinses and oral cancer

The issue

Do alcohol-containing mouthrinses play a role in the development of oral cancer?

The association between alcohol-containing mouthrinses and the development of oral cancer has been a periodic topic of scientific study since the late 1970s. Because heavy alcohol consumption is a known risk factor for the development of oral cancer, researchers looked into the possibility that use of alcohol-containing mouthrinses may also put people at risk.

The International Agency for Research on Cancer, an extension of the World Health Organization, now identifies the consumption of ethanol in alcoholic beverages as a carcinogenic risk.¹ Alcohol abuse is associated with cancers of the mouth, pharynx, larynx and esophagus.¹ The reason for this association is not fully understood – it may be due to a direct effect of alcohol on these tissues;² however researchers have also speculated that the alcohol metabolite, acetaldehyde, and alcohol's ability to enhance mucosal penetration of other carcinogenic chemicals may be involved.¹ Alcohol abuse and smoking seems to dramatically increase an individual's risk for developing oral cancer. Populations deficient in aldehyde dehydrogenase, the enzyme that clears acetaldehyde from the body, are also at greater risk for developing oral cancer associated with heavy alcohol ingestion.

What we know

Research would need to meet certain criteria before the scientific community would accept a causal relationship between alcohol-containing mouthrinses and oral cancer. These are defined by Bradford Hill's criteria for causality:³

- *strength*, which is defined by the size of the association;
- *temporal relationship*, i.e., mouthrinse use must precede the occurrence of oral cancer;
- *dose-response relationship*, i.e. mouthrinses with more alcohol or when used more frequently are associated with a higher incidence of oral cancer;
- *consistency*, i.e., the effect has been observed consistently in different studies with different populations;
- *consideration of alternate explanations*, for example confounding variables; and
- *biologic plausibility*, i.e., the event is defined by the mechanism of action of the drug.

None of these criteria have been fulfilled by the study results published so far. The strength of the association is weak, it is unknown if the use of mouthrinse precedes development of oral cancer, studies have found no dose-response relationship, the findings between different studies and study populations are inconsistent, alternate explanations exist and the mechanism of action is not defined.

The results of the studies published to date looking at alcohol-containing mouthrinses and oral cancer, have neither established nor refuted a causal relationship between the use of these products and the development of oral cancer. Of all the studies published on this topic, beginning in 1979, four studies reported some positive results^{4,5,6,7} while five found no association.^{8,9,10,11,12} These contradictory findings can be explained by shortcomings in study design. For example, these studies:

- have relied on surveys or interviews of subjects;
- have not adequately documented exposure to known risk factors like alcohol consumption, and use of smokeless and regular tobacco;
- lacked information on onset, duration, frequency and type of mouthrinse used.

Another important consideration is that people may turn to mouthrinse to mask alcohol and tobacco use both of which are risk factors for the development of oral cancer. Rinses also may be used in response to symptoms and treatment side-effects of existing oral cancer, which can cause bad breath and dry mouth. Such confounding factors may explain why some studies find an association between alcohol-containing mouthrinse and oral cancer that is not the result of a cause-and-effect relationship.

As a result scientific experts generally agree that the weight of the available evidence does not support a connection between oral cancer and alcohol-containing mouthrinse.

Research gaps

Study design has been the major obstacle to reaching conclusions about the relationship between alcohol-containing mouthrinse and oral cancer based on the research published to date. This could be overcome with well-designed prospective studies that document the type of mouthrinse used, the onset, duration and frequency of mouthrinse use, and the presence of other oral cancer risk factors.

Clinical Implications

Alcohol-containing mouthrinses are considered safe and effective in helping to prevent and reduce gingivitis and plaque when used as directed. Some individuals may be at greater risk for developing oral cancer due to life style and/or genetic factors. For this reason, it may be prudent to advise individuals that smoke, have an intolerance for alcohol (e.g. aldehyde dehydrogenase deficiency), have risk factors for developing oral cancer or a history of oral cancer to limit their use of alcohol-containing products.

ADA Seal of Acceptance

The ADA Council on Scientific Affairs has awarded the ADA Seal of Acceptance to several over-the-counter alcohol-containing mouthrinses that are intended to help reduce plaque and gingivitis. The Council awarded the Seal to these products after a thorough review of data on their safety and effectiveness. If new studies emerge questioning the safety of products with the ADA Seal, the

Council evaluates them. If the studies raise a concern about product safety, the Council has the ability to withdraw the Seal from the product in question.

The ADA has approved the following statement for Accepted mouthrinses for the control of plaque and gingivitis:

The ADA Council on Scientific Affairs' Acceptance of (product name) is based on its finding that the product is effective in helping to prevent and reduce gingivitis and plaque above the gumline, when used as directed.

At this time there appears to be insufficient evidence to alter the above statement based on the presence or absence of alcohol in mouthrinse preparations. With that said, the ADA Council on Scientific Affairs will continue to monitor scientific evidence associated with alcohol-containing oral healthcare products and the risk of oral pharyngeal cancer.

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 - ⁵ Blot WJ, Winn DM, Fraumeni JF Jr. Oral cancer and mouthwash. *J Natl Cancer Inst* 1983;70:251-3.
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