Effects of Alternative Smoking (E-Cigarettes, Waterpipe, IQOS) on Oral Health Abstract Alternative smoking methods such as electronic cigarettes (e-cigarettes or vaping), waterpipe (shisha), and heated tobacco products (IQOS) are increasingly popular, with claims of reduced harm compared to conventional cigarettes.Heat-not-burn tobacco (IQOS), oral fibroblasts and keratinocytes: Cytotoxicity, morphological analysis, apoptosis and cellular cycle.Pocket depth, bleeding, attachment loss (OR?4.3) Intermediate; CAL higher than non-smokers, lower than conventional smokers Oral Mucosa Lesions White patches ~20%; micronuclei; pre-malignant signs Acanthosis, dysplasia, hyperparakeratosis; pre-malignant Limited data; mild potential changes Pre-malignant Risk ?Vaping is associated with xerostomia (dry mouth), decreased salivary flow, disrupted oral microbiome, and increased pathogenic bacteria such as Streptococcus.--- Introduction Electronic cigarettes (e-cigarettes), waterpipe (shisha), and heated tobacco products (IQOS) are marketed as safer alternatives to conventional smoking.This report reviews the oral health consequences of each product, focusing on periodontal health, oral mucosal lesions, pre-malignant risks, xerostomia, microbiome changes, and cytotoxic/genotoxic effects.Micronuclei, binucleated cells Cytotoxic/genotoxic changes, OPMDs Unclear; low cytotoxicity, proliferation may pose future risk Saliva Flow & Properties ?https://doi.org/10.4103/jpbs.jpbs_1352_24 Senaratne, N. L. N. M., Chong, C. W., Yong, L. S., Yoke, L. F., & Gopinath, D. G. (2023).https://doi.org/10.18295/squmj.6.2022.043 Camoni, N., Conti, G., Esteves-Oliveira, M., Carvalho, T. S., Roccuzzo, A., Cagetti, M. G., & Campus, G. (2023).--- Oral Health Effects by Product E-Cigarettes (Vaping) Periodontal health: Increased gingival inflammation, mild clinical attachment loss compared to non-smokers.Cytotoxicity/Genotoxicity: In vitro studies show low cytotoxicity; increased fibroblast and keratinocyte proliferation, minor cellular cycle changes.https://doi.org/10.3389/froh.2023.1275717 Alsenani, M., Alothman, L., Alsenaidi, J., Alnowaiser, A., Aldawsari, M., & Alharbi, N. (2025).https://doi.org/10.3290/j.ohpd.a32671 Valenti, C., Gambelunghe, A., Fanasca, L., Billi, M., Cianetti, S., & Marinucci, L. (2021).Waterpipe smoking is linked to greater periodontal pocket depth, gingival inflammation, attachment loss, and epithelial dysplasia.Microbiome: Dysbiosis with increased pathogenic bacteria (Streptococcus) and decreased beneficial species.https://doi.org/10.3390/app13179654 Bibars, A. R. M. A., Obeidat, S. R., Khader, Y., Mahasneh, A. M., & Khabour, O. F. (2015).However, studies show that these products can compromise oral health, affecting the periodontium, oral mucosa, salivary flow, and the oral microbiome.Salivary effects: Reduced unstimulated salivary flow, decreased buffering capacity, increased acidity.Cytotoxicity/Genotoxicity: Increased cellular stress, abnormal nuclear morphology, early markers of potential carcinogenesis.--- Heated Tobacco Products (IQOS) Periodontal health: Intermediate between non-smokers and conventional smokers.risk of malignancy No clear genetic mutations observed --- Discussion All alternative smoking methods expose the oral cavity to nicotine and chemical toxins.E-cigarettes show intermediate effects: less severe on gingival tissues but significant xerostomia and microbiome imbalance.Overall, none of these alternatives are fully safe; all exhibit pre-malignant and inflammatory markers in oral tissues.Electronic cigarettes, heated tobacco products, and oral health: A systematic review and meta-analysis.Oral mucosal lesions including white patches and micronuclei indicate potential pre-malignant changes.IQOS appears less cytotoxic than conventional

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cigarettes, but still affects periodontal tissues and cellular activity.Oral mucosa: Acanthosis, epithelial dysplasia, hyperparakeratosis.

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