

Occupational Dental Erosion - A Review

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Abstract

Objectives Dental erosion is the chemical wear of dentin and enamel due to chronic or frequent exposure to internal or external acids. Distinguishing dental erosion from other types of tooth wear, specifying underlying etiologic factors, and recognizing damage early can be challenging. Certain occupations pose a higher risk of developing dental erosion from workplace acidic exposures. The objective of this systematic review was to increase awareness of this preventable occupational disease, particularly relating to airborne acid exposures.

Methods To better understand the relationship between dental erosion and occupational acid exposures, we searched the medical/dental literature using appropriate systematic review searching protocols. The search was conducted through PubMed, Embase, and the Cochrane Library, including studies published until November 2009. We included all study styles. Studies not in English, exclusively on internal acid exposures, or on children were excluded. After reviewing the abstracts we selected relevant studies and hand-searched their reference lists for additional studies. We critically appraised 22 studies, which focused on dental erosion in relation to workplace airborne acids. One of these was a case-control study; 18 were cross-sectional studies; and 3 were case series/case reports. We also included 1 cross-sectional study on professional swimming (HCl exposure) and 2 on wine tasting (various organic acid exposures).

Results Workers in the mineral, battery, chemical, tin, dyestuff, fertilizer, and metal (galvanizing, plating, silicone sealing, acid pickling) industries have higher risk of airborne acid exposures, and hence dental erosion. Studies found that:

- dental erosion usually occurs at the labial surface of anterior teeth
- canines are affected less than central and lateral anteriors
- areas unprotected by lips/cheeks are at higher risk
- prevalence is higher in battery and galvanizing industries
- significant correlation exists between 'duration of exposure' & 'severity of erosion'

Professional swimmers and wine tasters face increased erosion risk due to HCl and organic acid exposures, respectively.

Conclusions Identification of contributing etiologic factors is important for appropriate management of dental erosion. There are various occupations with increased risk of workplace acid exposures, hence dental erosion. If dental erosion is recognized at early stages, further damage can be minimized. Preventive measures pertaining to lifestyle and work environment, and treatment of any underlying medical conditions, may change the ultimate outcome. Current literature on this topic consists of studies with low quality evidence (EBPG Levels of Evidence 3 & 4). Higher quality studies are needed to better guide evidence-based dental practices and workers' compensation processes.



Dental erosion is a chronic, progressive type of tooth wear, which destroys dental hard tissues (enamel and dentin). Erosion is the result of a chemical process, with no bacterial involvement, and is due to chronic and/or frequent exposure to internal or external acids.



Sulfuric,

hydrochloric, nitric, tartaric, chromic, phosphoric, and acetic acid exposures occur in various industrial work environments, such as mineral, battery, chemical, tin, dyestuff, fertilizer, silicone sealing and metal (galvanizing, plating, acid pickling) industries.

Working in these industries introduces a higher risk for occupational dental erosion.



Wine tasting

and wine making are considered high-risk occupations for dental erosion as the teeth are continuously exposed to various organic acids such as tartaric, malic, lactic, citric, succinic, and citramalic acids. Tooth loss is usually on the maxillary labial and incisal surfaces, as acid is retained longer in this region and clearance also takes longer.



Silicone seals

, which introduce higher risk for dental erosion, are used in various industries such as crafts and hobbies, automotive, electronics, building, and space, as well as in glass aquarium and sheet-metal manufacturing. Workers in silicone sealing jobs are usually exposed to acetic acid vapours.



Hydrochloric

acid, a by-product of gas chlorination during disinfection of swimming pools, leads to dental erosion.

Competitive swimmers, who use pools more frequently and spend longer hours in the pool compared to recreational swimmers, are exposed to low pH levels as a result of excess hydrochloric acid and are at a higher risk of developing dental erosion.

The first common finding on affected teeth of swimmers is a honeycomb-like etch pattern. Soon, general erosion dominates with a rapid development, especially at labial surfaces.

EBPG Levels of Evidence

1	Evidence from at least 1 properly randomized controlled trial (RCT) or systematic review of RCTs.
2	Evidence from well-designed controlled trials without randomization or systematic reviews of observational studies.
3	Evidence from well-designed cohort or case-control analytic studies, preferably from more than 1 centre or research group.
4	Evidence from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments could also be included here.
5	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.

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Our full report on Occupational Dental Erosion is available at
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