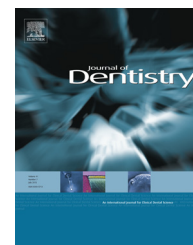


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## Review

# Estimated prevalence of erosive tooth wear in permanent teeth of children and adolescents: An epidemiological systematic review and meta-regression analysis

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## ABSTRACT

**Objectives:** The main purpose of this systematic review was to estimate the prevalence of dental erosion in permanent teeth of children and adolescents.

**Methods:** An electronic search was performed up to and including March 2014. Eligibility criteria included population-based studies in permanent teeth of children and adolescents aged 8–19-year-old reporting the prevalence or data that allowed the calculation of prevalence rates of tooth erosion. Data collection assessed information regarding geographic location, type of index used for clinical examination, sample size, year of publication, age, examined teeth and tissue exposure. The estimated prevalence of erosive wear was determined, followed by a meta-regression analysis.

**Results:** Twenty-two papers were included in the systematic review. The overall estimated prevalence of tooth erosion was 30.4% (95%IC 23.8–37.0). In the multivariate meta-regression model use of the Tooth Wear Index for clinical examination, studies with sample smaller than 1000 subjects and those conducted in the Middle East and Africa remained associated with higher dental erosion prevalence rates.

**Conclusions:** Our results demonstrated that the estimated prevalence of erosive wear in permanent teeth of children and adolescents is 30.4% with high heterogeneity between studies. Additionally, the correct choice of a clinical index for dental erosion detection and the geographic location play an important role for the large variability of erosive tooth wear in permanent teeth of children and adolescents.

**Clinical significance:** The prevalence of tooth erosion observed in permanent teeth of children and adolescents was considerable high. Our results demonstrated that prevalence rate of erosive wear was influenced by methodological and diagnosis factors. When tooth erosion is assessed, the clinical index should be considered.

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## 1. Introduction

Dental erosion is defined as the irreversible loss of hard tissue mainly caused by a chemical process of acid dissolution without bacterial involvement and not directly associated with traumatic factors nor dental caries.<sup>1,2</sup> Erosive tooth wear co-exists with other types of wear, such as attrition and abrasion. In early stages, chemical erosion could be the main type of tooth wear, thus erosion could be expected in children.<sup>3</sup> Considering the clinical features, dental erosion is characterized by shallow flat silky concavities with round limits and smooth surfaces, which are often plaque and stain free.<sup>4</sup> Previous investigations have demonstrated that severe tooth wear could interfere on normal physiology and aesthetics, causing sensitivity in children.<sup>5</sup> Its aetiology is multifactorial composed by intrinsic and extrinsic factors, with biological, chemical and behavioural conditions influencing the development of dental erosion.<sup>6</sup>

The worldwide prevalence of dental erosion in children and adolescents aged between 8 and 19 years remains unclear, with rates ranging from 7.2%<sup>7</sup> to 95.0%.<sup>8</sup> According to the authors, the variability in the obtained prevalence rates may be explained by different indices used to diagnose dental erosion, type of examined teeth, sample size, age and geographic factors.<sup>7,9</sup> According to some studies,<sup>9,10</sup> the Tooth Wear Index (TWI), adopted in most studies, can overestimate the prevalence, as it is not specific for detection of dental erosion. Additionally, geographic location seems to influence the prevalence rates observed in literature, since cultural, ethnical and dietary habits vary according to the region where the study was conducted.<sup>11,12</sup> Moreover, the sample size enrolled in the study appears to influence the prevalence rate obtained. Working with a population-based sample avoids bias, and provides strong information to answer the research question.<sup>7</sup>

A systematic review evaluating the prevalence of tooth wear in children and adolescents was published in 2010.<sup>13</sup> Even though, relevant differences could be noted between the previous systematic review and ours. Firstly, the previous review included subjects in the deciduous, permanent and mixed dentition and did not focus specifically on erosive wear, including studies with any type of wear, also attrition and abrasion. Thus, it is possible to assume that this approach could misrepresent the actual prevalence rate of erosive tooth wear in permanent teeth. Additionally, many clinical studies investigating erosive tooth wear in children and adolescents have been published since then, justifying, then, our review.

Considering the above mentioned, the main purpose of this study was to conduct an extensive and systematic review of the literature on the prevalence of dental erosion in permanent teeth of children and adolescents to (1) calculate a worldwide pooled prevalence estimate; and (2) determine factors implicated in the variability of estimates by assuming the assumptions of different estimates based on the used indices to diagnose dental erosion.

## 2. Methods

### 2.1. Search strategy

Literature was searched in a structured way to identify papers that analyzed the prevalence of tooth erosion in permanent teeth of children and adolescents aged 8–19-year-old. This systematic review followed the PRISMA statements. Initially, electronic database searches of PubMed and Medline, ISI Web of Knowledge, Scopus, Scientific Electronic Library online (SciELO), Latin American and Caribbean Health Sciences (LILACS) were performed up to and including March 2014, using MeSH terms and other keywords in several combinations presented in Table 1. No limits were used. All titles of the searches and abstracts of the papers that satisfied the eligibility criteria described below were assessed. The full text of the papers considered by title and abstract to be pertinent for this review was then read.

Two authors (M.M.S.S. and G.G.N.) reviewed the selected literature in order to classify as suitable or not to be included in this review. Duplicate references were excluded. Lists were compared and in the case of disagreements, decisions were made following discussion based on the determined inclusion and exclusion criteria. Later, additional publications were screened by the same two authors using a hand search of the reference lists of the studies that were found to be relevant in the previous step. Cases of disagreement between authors were solved following discussion. Predefined data-collection worksheets were employed for the assessment of each selected publication.

### 2.2. Inclusion and exclusion criteria

The criteria for including a paper in this systematic review were original observational studies – cross-sectional and prospective longitudinal studies – performed with children and adolescents aged between 8 and 19 years with permanent teeth reporting the prevalence rate or data that allowed the calculation of prevalence rates of tooth erosion. The definition of erosive tooth wear considered the one given in each study. Only population-based studies with representative sample

**Table 1 – Search strategy used.**

“Tooth wear OR tooth wears OR wear, tooth OR wears, tooth OR dental wear OR dental wears OR wear, dental OR wears, dental OR erosion, tooth OR erosions, tooth OR tooth erosions OR erosive tooth wear OR erosion OR dental erosion OR tooth erosion OR dental erosive wear OR erosive wear OR tooth erosive lesions) AND (child OR children OR adolescents OR adolescent OR teens OR teen OR teenagers OR teenager OR youth OR youths OR adolescence OR schoolchildren OR scholars) AND (epidemiological studies OR cross sectional studies OR cross-sectional study OR studies, cross-sectional OR prevalence studies OR prevalence study OR studies, prevalence OR study, prevalence OR cohort study OR incidence study OR studies, incidence OR study, incidence OR follow up studies OR follow-up study OR case control”

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