Natural Resources for Human Health

visagaa publishing house

Original Research

View Article online

Check for updates

Received 23 April 2026
Revised 19 May 2026
Accepted 16 June 2026
Available Online 28 August 2026

Edited by Kannan RR Rengasamy

KEYWORDS:
Green tea
Camellia sinensis
Dental erosion
Erosive tooth wear
Catechins
Polyphenols

Natr Resour Human Health 2026; 6 (4): 570–582
https://doi.org/10.53365/nrfhh/224642
eISSN: 2583-1194

Evidence on Green Tea–Derived Compounds for Dental Erosion Prevention: An Umbrella Review of Review-Level Studies

Uzma Parveen Qureshi, Ladusingh Rajpurohit, Vini Mehta, Reshma Rameshrao Ghaytidak

[1]Public Health Dentistry, Dr. D.Y. Patil Dental College and Hospital Pimpri Pune, India
[2]Public Health Dentistry, Dr. D.Y. Patil Dental College & Hospital, Dr. D.Y. Patil Vidyapeeth (Deemed to be University), Pune 411018, India

ABSTRACT: Background: Dental erosion, also referred to as erosive tooth wear, is the irreversible loss of dental hard tissues due to the effects of acids. In addition to the use of fluorides for the prevention of dental erosion, other compounds, such as polyphenols, have been investigated as adjuncts in the prevention of dental erosion. Compounds such as epigallocatechin gallate (EGCG), which are present in the leaves of the *Camellia sinensis* plant used to prepare green tea, have the potential to prevent the degradation of the matrix and the pellicle, thereby preventing dental erosion. **Objective:** This umbrella review aims to critically appraise the review-level evidence on the effects of the use of green tea and its active compounds on dental erosion. **Methods:** An umbrella review was conducted to assess the effects of the use of green tea and its active compounds on dental erosion and erosive tooth wear, following the PRISMA 2020 protocol. An electronic search of databases, including PubMed/MEDLINE, Scopus, Web of Science, Embase, and the Cochrane Library, was conducted to identify systematic reviews and meta-analyses on the effects of the use of green tea and its active compounds on dental erosion and erosive tooth wear. **Results:** Six systematic reviews were included. The evidence generally supports the notion that green tea-derived compounds have a protective effect on dentin erosion, particularly in laboratory and *in situ* studies. The evidence regarding enamel was more variable. The only quantitative systematic review found that green tea-derived compounds resulted in significant reductions in dentin surface loss; however, it also reported high heterogeneity. The quality of the evidence ranged from high to critically low. The certainty of the evidence was generally low for dentin and very low for enamel and clinical outcomes. **Conclusion:** Green tea polyphenols have shown promise as adjuncts to the prevention of dental erosion. The evidence base is composed mainly of experimental studies. Clinical trials are required to support the effectiveness of green tea-derived compounds.

1. INTRODUCTION

Dental erosion, which is presently included under the broader classification of erosive tooth wear (ETW), has been defined as the irreversible loss of dental hard tissues due to non-bacterial chemical action. Dental erosion results from the repeated exposure of teeth to either intrinsic or extrinsic acids, leading to the dissolution of enamel and dentin, followed by mechanical wear, which can exacerbate the damage [1]. Over the past two decades, dental erosion has emerged as a major

* Corresponding author.
E-mail address: Ladusingh.rajpurohit@dpu.edu.in (Ladusingh Rajpurohit)

oral health concern worldwide, with implications for children and adults of all ages. Epidemiological studies, particularly those conducted among European and other high-income adolescent populations, have reported that erosive tooth wear may affect approximately 30–50% of adolescents and young adults, with even higher prevalence observed among individuals with frequent acidic dietary exposure, gastroesophageal reflux disease, or sports drink consumption habits [2,3]. Dental erosion differs from dental caries, which is plaque-mediated and can be reversed through the action of fluoride, in that it involves the direct mineral dissolution and softening of the tooth surface.

The pathophysiology of dental erosion is complex. Acid exposure decreases surface microhardness, increases surface roughness, and enhances the loss of calcium and phosphate ions from the enamel prism structure [4]. Once the dentin surface is exposed, the erosion process accelerates because of its lower mineral content and the presence of an organic collagen matrix that can be degraded by the host's proteolytic enzymes, such as matrix metalloproteinases (MMPs) and cysteine cathepsins [5]. As a result, dentin erosion involves not only demineralization but also the enzymatic degradation of the organic matrix exposed to the oral environment, resulting in increased tissue collapse and a higher wear rate. This explains why dentin lesions progress more rapidly and are more challenging to treat than enamel lesions.

The current approaches to the prevention of dental erosion are primarily focused on reducing acid contact and enhancing tissue resistance. Fluoride-based materials, particularly stannous fluoride and high-concentration fluoride varnishes, are the cornerstone of the prevention of dental erosion because of their ability to stimulate the formation of mineral deposits while simultaneously reducing mineral solubility [6]. However, there are situations in which the use of fluoride materials is not sufficient to prevent dental erosion. In the past few years, there has been an increasing number of studies focused on the development of alternative or supplementary materials, including calcium phosphate, casein phosphopeptide-amorphous calcium phosphate, bioactive glass, and plant-based materials [7]. Botanical materials containing polyphenols have attracted considerable attention because of their ability to modify the acquired pellicle, improve surface resistance, and inhibit dentin matrix degradation.

Green tea (*Camellia sinensis*) is a very popular beverage worldwide and is rich in bioactive polyphenols, especially catechins such as epigallocatechin gallate (EGCG), epicatechin, and epicatechin gallate [8]. The biological activities of these compounds include well-documented antioxidant, anti-inflammatory, antimicrobial, and enzyme-inhibitory effects. In the dental field, green tea extracts have shown positive effects in the prevention of dental caries, periodontal diseases, and halitosis [9,10]. More recently, laboratory and *in situ* studies have suggested that green tea polyphenols may reduce erosive tissue loss through several mechanisms. First, catechins may bind to salivary proteins, thereby altering the acquired pellicle and making it thicker and more resistant to acid diffusion [11]. Second, they may inhibit MMPs and cathepsins, thus preserving the dentin collagen matrix after demineralization and preventing structural failure [12]. Third, their antioxidant properties may prevent the oxidative degradation of organic materials, further improving dentin resistance. Despite these promising biological mechanisms, the clinical role of green tea in the prevention and management of dental erosion remains unclear. Individual *in vitro* and *in situ* studies have yielded inconsistent results, with some studies showing a reduction in surface loss and an improvement in microhardness, whereas others have shown minimal effects that vary depending on the concentration, duration, and model used [13]. The erosive potential of tea beverages themselves has also been questioned. While unsweetened green or black tea tends to have a near-neutral pH and low titratable acidity and can be considered non-erosive, flavored and bottled teas, as well as sweetened green tea, may contain added acids that can be erosive [14].

To synthesize the growing body of evidence, several systematic reviews have assessed natural or plant-derived compounds for dental erosion, including green tea or catechins as part of the included interventions [15]. Moreover, tea-related and green tea-related systematic reviews have assessed the relationship between tea consumption and dental hard tissue outcomes [16,17]. It is noteworthy that these systematic reviews differ considerably in terms of scope, methodology, and design. The systematic reviews include *in vitro*, *in situ*, and clinical studies with diverse outcomes. It is also challenging for clinicians and investigators to identify the overall evidence base because of overlapping systematic reviews that report partially redundant and conflicting findings.

Umbrella reviews, which refer to reviews of systematic reviews and meta-analyses, represent a higher level of evidence synthesis by critically appraising and integrating the findings of systematic reviews and meta-analyses. The methodology of conducting an umbrella review helps identify the consistencies, gaps, and limitations of systematic reviews while also providing an overall summary of the evidence landscape. As natural preventive strategies continue to attract increasing attention and green tea is widely consumed, an umbrella review is necessary to assess whether the available evidence supports a role for green tea and its derivatives in the prevention and mitigation of dental erosion.

Thus, the aim of the current umbrella review is to systematically identify, appraise, and synthesize the findings of available systematic reviews and meta-analyses examining the effects of green tea, green tea extracts, catechins, and other polyphenols on dental erosion-related outcomes. This review aims to determine the magnitude of the anti-erosive effects of these agents by consolidating the evidence available from review-level studies and to establish the quality and certainty of the available evidence to inform the findings.

2. MATERIALS AND METHODS

2.1. Study design

This study was conducted as an umbrella review, which is a systematic approach to the synthesis of evidence based on the findings of prior systematic reviews and meta-analyses. An umbrella review is the highest level of evidence synthesis because it brings together the findings of a variety of review-level studies to allow for the comparison of the consistency, quality, and certainty of the evidence across a body of literature. The purpose of the current study was to conduct a systematic review of the review-level evidence on the effects of green tea (*Camellia sinensis*), green tea extracts, catechins, and polyphenols on dental erosion and erosive tooth wear outcomes. The methodological approach for the current study was based on the *Joanna Briggs Institute Manual for Umbrella Reviews* and was conducted according to the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020* statement [18,19]. The methodological quality of the included systematic reviews was assessed using *A Measurement Tool to Assess Systematic Reviews 2* (AMSTAR-2) [20].

2.2. Review question

The primary question was formulated as follows: “Do green tea or green tea bioactive compounds reduce tissue loss of dental enamel and dentin associated with dental erosion compared with placebo, no intervention, or conventional preventive agents?” The research question was formulated according to the Population, Intervention, Comparator, Outcomes, and Study design (PICOS) approach.

2.3. Eligibility criteria

Eligibility criteria were established *a priori* using the PICOS approach. Systematic reviews were considered eligible for inclusion if they included human clinical trials, *in situ* experimental models involving intraoral appliances, or *in vitro* enamel and dentin samples simulating erosive conditions. The interventions of interest were green tea extracts, green tea preparations, *Camellia sinensis*, catechin compounds such as EGCG, or combinations involving green tea in the form of mouthwashes, gels, varnishes, or dentifrices. The comparative interventions were placebo, distilled water, no treatment, or established anti-erosive agents such as fluoride or calcium phosphate technology.

Outcomes of interest included quantitative measures of tissue loss in enamel or dentin using profilometry, micro-CT, or 3D surface analysis. Secondary outcomes included changes in surface microhardness, surface roughness, mineral content, or pellicle composition.

Narrative reviews, opinion pieces, conference abstracts, and individual primary studies were excluded from the review process to avoid methodological bias and the duplication of primary data.

2.4. Information sources and search strategy

The literature search strategy involved a comprehensive electronic search of multiple databases, including PubMed/MEDLINE, Scopus, Web of Science, Embase, and the Cochrane Library. The search was conducted from database inception to December 2025. Controlled vocabulary terms (MeSH and Emtree terms, where applicable) and free-text keywords related to green tea, *Camellia sinensis*, catechins, EGCG, polyphenols, dental erosion, and erosive tooth wear were combined using Boolean operators to maximize search sensitivity. The search strategies were adapted according to the indexing systems and syntax requirements of each database. The detailed electronic search strategies used for all databases are presented in Table S1.

2.5. Study selection

The database search identified 412 records through electronic databases, and an additional 18 records were identified through manual reference screening. After the removal of duplicate records, 328 unique studies remained for title and abstract screening. Of these, 299 records were excluded because of irrelevance, a non-review study design, or a lack of erosion-related outcomes. Subsequently, 29 full-text articles were assessed for eligibility. Following the full-text evaluation, studies were excluded because they were not systematic reviews, did not report erosion-related outcomes, or were not relevant to green tea interventions. Finally, six systematic reviews met the predefined eligibility criteria and were included in the qualitative synthesis. The study selection process was conducted according to the PRISMA 2020 flow framework [19].

Table 1
Overlap of primary studies across included systematic reviews.

Primary study (First author, year)	Memarpour 2025 [15]	Seyedjavadi 2022 [16]	Jaâfoura 2014 [17]	Leal 2023 [22]	Inchingolo 2023 [23]	Ruiz 2023 [24]
Hara 2009 [13]	✓			✓		
Kato 2010 [12]	✓			✓	✓	
Hannig 2012 [11]	✓		✓			
Schlueter 2014 [3]	✓	✓				
Buzalaf 2012 [28]		✓		✓		
Bedran-Russo 2014 [30]	✓				✓	
Flemming 2022 [31]		✓			✓	✓
West 2014 [32]			✓			✓

✓ = primary study included in the respective review.

2.6. Data extraction

Data extraction was performed by two independent reviewers using a standardized data extraction template. The extracted data included the author and year of publication, review design, number and type of included studies, databases searched, participants or specimens, interventions, outcomes measured, results, methods of statistical pooling, heterogeneity, and limitations.

Inter-reviewer agreement for study selection was assessed using Cohen's kappa statistic. The agreement between the two reviewers was found to be substantial (κ = 0.84).

2.7. Quality appraisal

The methodological quality of the included reviews was assessed using AMSTAR-2, a validated critical appraisal tool designed for systematic reviews of randomized and non-randomized studies [20]. The tool assesses several domains, including registration of the systematic review protocol, the comprehensiveness of the search strategy, justification for excluded studies, evaluation of the risk of bias of the included studies, suitability of the statistical synthesis, evaluation of publication bias, and reporting of funding sources and conflicts of interest. The quality of each included systematic review was rated as high, moderate, low, or critically low confidence using AMSTAR-2. The critical appraisal was conducted by two investigators to reduce subjectivity.

Inter-reviewer agreement for the AMSTAR-2 quality appraisal was also evaluated using Cohen's kappa statistic and demonstrated substantial agreement between the reviewers (κ = 0.81). Any disagreements were resolved through discussion and consensus.

2.8. Data synthesis

In light of the anticipated heterogeneity in study design, interventions, and outcome variables assessed in the included reviews, a quantitative approach to data pooling was not deemed feasible. As such, a structured narrative approach to synthesizing the review findings was employed, as recommended for the conduct of umbrella reviews when a meta-meta-analysis approach is not feasible. In this regard, the findings of the reviews were synthesized and presented by tissue type (enamel and dentin), intervention type (preventive and therapeutic), and study setting (clinical, *in situ*, and *in vitro*). In addition, the strength and direction of the evidence were assessed qualitatively, taking into account the methodological quality and overlap of the reviews. Finally, the certainty of the evidence was assessed by examining the methodological rigor of the reviews, the consistency of the findings, and their direct applicability to the clinical question under investigation.

The methods employed for the systematic review, including the identification of studies, screening, eligibility assessment, and inclusion, are summarized in Figure 1 and were conducted in accordance with the PRISMA 2020 reporting guidelines [19].

The distribution of primary studies across the included systematic reviews and the extent of overlap among the reviews are shown in Table 1. The corrected covered area (CCA), used to quantify the degree of overlap among the systematic reviews, is presented in Table 2.

The overlap among the included systematic reviews was determined using a corrected covered area (CCA) calculation, in which frequently occurring primary studies within each included systematic review were mapped using the citation matrix method. The overlapping primary studies concerning green tea compounds and dental erosion were identified

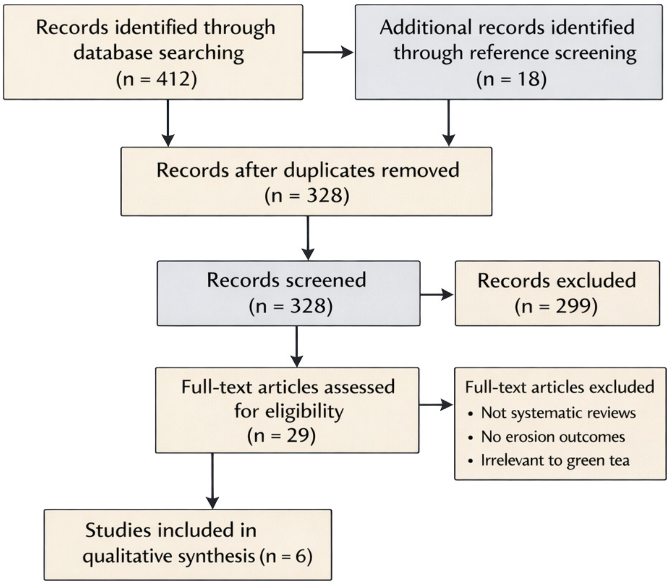


Figure 1. PRISMA 2020 flow diagram of study selection.

Table 2
Corrected Covered Area (CCA) for overlap.

Parameter	Value
Number of primary study occurrences across reviews (N)	21
Number of unique primary studies (r)	8
Number of systematic reviews (c)	6
CCA formula	(N − r) / [r × (c − 1)]
Calculated CCA	**0.33 (33%)**
Interpretation	High overlap [21]

and tallied. The CCA was calculated according to the formula recommended for umbrella reviews: CCA = (N − r) / [r × (c − 1)], where N is the number of occurrences of the primary studies, r is the number of primary studies, and c is the number of included systematic reviews. According to the standards suggested by Pieper et al., a CCA value of 0–5 denotes slight overlap, 6–10 indicates moderate overlap, 11–15 denotes high overlap, and a value exceeding 15 indicates very high overlap [21].

The certainty of the evidence was assessed using an adapted outcome-level approach informed by GRADE principles. Certainty ratings were determined qualitatively based on the methodological quality of the included systematic reviews (AMSTAR-2 ratings), the consistency of findings across reviews, the degree of indirectness, the risk of bias within the included studies, and the imprecision related to heterogeneity and variability in outcome reporting. Owing to the predominance of *in vitro* and *in situ* evidence and the absence of sufficient clinical data, a formal quantitative GRADE assessment was not feasible. Therefore, the certainty classifications presented should be interpreted as narrative evidence certainty assessments rather than formal guideline-based GRADE recommendations.

3. RESULTS

3.1. Characteristics of included reviews

Of the six systematic reviews included, two were specific to tea or green tea interventions, whereas the other four reviews included broader groups of plant-derived compounds, natural preventive agents, or polyphenolic substances, with green tea- or catechin-based interventions included among the interventions.

In terms of the design of the included studies, three of the systematic reviews included studies that were primarily *in vitro*, involving extracted enamel or dentin specimens exposed to standardized erosive challenges. Two of the systematic reviews included *in situ* experimental studies, in which enamel or dentin specimens were placed intraorally in human subjects. Only one of the systematic reviews included randomized clinical trials involving human subjects; however, erosion-related endpoints were not the primary endpoints of these studies.

Of the included reviews, only one performed a quantitative meta-analysis. The systematic review and meta-analysis conducted by Memarpour et al. 2025 was the most methodologically rigorous review. It demonstrated a statistically significant reduction in dentin surface loss with the application of green tea derivatives compared with the control solutions. The pooled analysis demonstrated a significant reduction in dentin surface loss in favor of green tea-derived compounds compared with the control interventions (MD: −0.89 μm; 95% CI: −1.68 to −0.09); however, the findings should be interpreted with caution because of the substantial heterogeneity among the included studies (I^2 = 91%) [15].

The reviews conducted by Leal et al. [22] and Inchingolo et al. [23] examined polyphenolic agents and natural preventive agents in general. Both reviews reported trends toward the preventive effects of catechin-containing preparations, including green tea derivatives. However, the reviews were limited to qualitative findings because of the substantial heterogeneity, which precluded the performance of a quantitative synthesis [24,25].

The clinical-focused review conducted by Seyedjavadi-Limoodi et al. examined reviews of randomized trials investigating green tea derivatives in the form of mouthrinses, dentifrices, or extracts. Although improvements in oral hygiene and periodontal health were observed with the use of green tea derivatives, there was limited information regarding dental erosion [16].

The first review included in this study, conducted by Jaâfoura et al., examined the erosive potential of tea beverages and found that green and black tea infusions were non-erosive because of their pH and titratable acidity values, which were closer to neutral. The erosive potential may increase in processed and/or sweetened tea beverages because of the presence of added acids, highlighting the role of formulation and preparation methods in dietary exposure risks [17]. A summary of the characteristics of the included reviews is provided in Table 3.

3.2. Methodological quality of included reviews

The methodological quality of the systematic reviews was assessed using AMSTAR-2 [20]. The quality of the included systematic reviews was found to be variable. One systematic review was rated as high confidence because it included protocol registration, detailed search strategies, duplicate screening and data extraction, risk of bias assessment, and appropriate quantitative synthesis. One systematic review was rated as moderate confidence, primarily because it included a reasonably detailed search strategy and risk of bias evaluation. However, it lacked other important methodological safeguards, such as protocol registration and publication bias assessment. The remaining four systematic reviews were rated as having low to critically low confidence, mainly because of the absence of predetermined protocols, detailed search strategies, duplicate screening, and formal risk of bias assessments of the primary studies. The outcome-level synthesis across the included systematic reviews is summarized in Table 5, following established umbrella review methodology [20].

4. SYNTHESIS OF FINDINGS

4.1. Dentin erosion outcomes

The most consistent evidence of the protective effects was observed with dentin substrates. The quantitative review conducted by Memarpour et al. 2025 showed that the application of green tea extract significantly reduced tissue loss in dentin compared with the control treatments. This finding suggests a significant protective effect of green tea against erosive tissue loss [15]. The *in situ* studies reviewed by Leal et al. showed that the application of polyphenol solutions before an acid challenge reduced mineral loss from dentin surfaces [22]. These findings are biologically plausible because dentin erosion involves not only mineral loss but also the enzymatic degradation of the exposed organic matrix. The catechins

Table 3
Characteristics of included systematic reviews.

Author	Year	Review design	Study models included	Green tea exposure	Principal findings
Memarpour [15]	2025	Systematic review + meta-analysis	In vitro, in situ	Yes	Reduced dentin loss; high heterogeneity
Seyedjavadi-Limoodi [16]	2022	Systematic review	Clinical trials	Yes	Suggested protective oral effects including erosion modulation
Jaâfoura [17]	2014	Systematic review	Laboratory studies	Yes	Unsweetened tea non-erosive
Leal [22]	2023	Systematic review	In situ models	Yes	Polyphenols showed protective effects
Inchingolo [23]	2023	Systematic review	Mixed designs	Yes	Natural agents beneficial in prevention
Ruiz [24]	2023	Systematic review	Dietary exposure studies	Tea exposure	

Table 4
Outcome-level evidence synthesis and certainty assessment.

Outcome	Reviews contributing	Study type	Direction of effect	Consistency	Risk of bias	Indirectness	Imprecision	Overall certainty
Dentin tissue loss	2	In vitro/in situ reviews	Protective	Moderate	Moderate	Moderate	Moderate	Low
Enamel tissue loss	2	In vitro reviews	Mixed	Low	Moderate	Moderate	High	Very low
Microhardness	3	In vitro/in situ	Improved	Moderate	Moderate	Moderate	Moderate	Low
Clinical erosion outcomes	1–2	Clinical reviews	Limited evidence	Low	High	High	High	Very low

Table 5
Detailed AMSTAR-2 assessment of included systematic reviews.

AMSTAR-2 domain	Memarpour 2025 [15]	Leal 2023 [22]	Seyedjavadi 2022 [16]	Inchingolo 2023 [23]	Ruiz 2023 [24]	Jaâfoura 2014 [17]
Protocol registered prior to review	Yes	Yes	No	No	No	No
Research question & inclusion criteria defined	Yes	Yes	Yes	Yes	Yes	Partial
Comprehensive search strategy	Yes	Yes	Partial	Partial	Partial	Limited
Study selection in duplicate	Yes	Yes	Not reported	Not reported	Not reported	No
Data extraction in duplicate	Yes	Yes	Not reported	Not reported	Not reported	No
List of excluded studies provided	Yes	No	No	No	No	No
Included studies described in detail	Yes	Yes	Moderate	Moderate	Moderate	Limited
Risk of bias assessed	Yes	Yes	Partial	Limited	Limited	No
Risk of bias considered in conclusions	Yes	Yes	Partial	No	No	No
Meta-analysis appropriate	Yes	NA	NA	NA	NA	NA
Publication bias evaluated	Yes	No	No	No	No	No
Funding sources reported	Yes	No	No	No	No	No

in green tea are known to exert inhibitory effects on matrix metalloproteinases as well as cathepsins, which may contribute to the preservation of dentin tissue. However, the quantitative comparability of the studies was limited because of differences in the experimental designs, concentrations of green tea extract, and acid challenge protocols. Overall, the available evidence suggests a moderate protective effect of green tea on dentin erosion, although the certainty of this conclusion is limited by the substantial heterogeneity and the predominance of laboratory-based data.

4.2. Enamel erosion outcomes

With respect to enamel protection, the results were inconsistent. Some *in vitro* studies showed a small increase in surface microhardness and a reduction in mineral loss following treatment with green tea extract, whereas others demonstrated minimal effects depending on the study conditions, such as pH, exposure time, and concentration. The reviews concluded that green tea provides a degree of protection to enamel; however, the magnitude and consistency of this protection remain unclear and are generally less pronounced than those observed for dentin protection [22,23].

The disparity between the protective effects on enamel and dentin may be attributed to differences in the composition of these tissues, with enamel being highly mineralized and devoid of the organic matrix that would be affected by catechins and their enzyme-inhibitory activity.

The outcome-level synthesis, including the direction of effects and the certainty of the evidence across outcomes, is summarized in Table 4.

4.3. Clinical outcomes

Clinical evidence supporting the anti-erosive effects of green tea has not been well established. Seyedjavadi-Limoodi et al. conducted a review of randomized trials to evaluate the effects of tea on oral health, focusing primarily on its antimicrobial effects, plaque, and periodontal parameters, while only indirectly reporting its effects on erosive parameters [16]. No large-scale randomized clinical trial has been conducted to evaluate the effects of tea on erosive tooth wear as a primary outcome.

4.4. Beverage exposure considerations

Dietary exposure to tea, together with the evidence from the literature regarding the pH and erosive potential of plain green or black tea infusions, indicates that plain tea is likely to have a near-neutral pH and low erosive potential and is, therefore, not a significant contributor to dental erosion when consumed without additives [24]. This further demonstrates the context-dependent relationship between tea and dental erosion, as well as the influence of formulation, preparation methods, and consumption habits on the final product and its potential effects on the consumer.

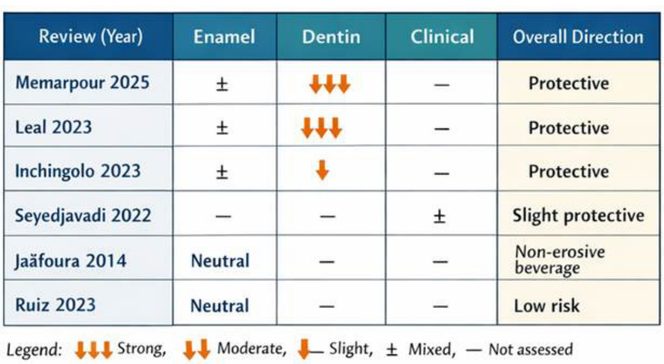
4.5. Overall evidence synthesis

When the results of the reviews are considered collectively, a consistent protective trend is evident for dentin outcomes, whereas the evidence for enamel outcomes remains mixed and limited. This pattern of findings is depicted in Figure 2, which provides a visual representation of the evidence map for the included reviews. The overall methodological confidence ratings and the key limitations of each included systematic review are summarized in Table 6.

5. DISCUSSION

5.1. Principal findings

This umbrella review has compiled data from six papers that explored the association between green tea and dental erosion. Taken together, the findings from these review-level studies suggest that green tea and its polyphenolic compounds may have a protective role against erosive tissue damage, with the effect being more apparent in dentin substrates. However, the certainty of the evidence is low to very low because of the high degree of methodological heterogeneity, the predominance of laboratory-based studies, and the absence of well-designed clinical studies. It is worth noting that the protective role of green tea and its compounds appears to be substrate-dependent, with dentin being more responsive to green tea-based treatments than enamel.



Review (Year)	Enamel	Dentin	Clinical	Overall Direction
Memarpour 2025	±	↓↓↓	—	Protective
Leal 2023	±	↓↓↓	—	Protective
Inchingolo 2023	±	↓	—	Protective
Seyedjavadi 2022	—	—	±	Slight protective
Jaăfoura 2014	Neutral	—	—	Non-erosive beverage
Ruiz 2023	Neutral	—	—	Low risk

Legend: ↓↓↓ Strong, ↓↓ Moderate, ↓ Slight, ± Mixed, — Not assessed

Figure 2. Evidence map of review-level findings on green tea and dental erosion

The improved efficacy in dentin can be explained and is consistent with the biological process of erosive tooth wear. Dentin erosion is associated not only with mineral loss but also with the degradation of the demineralized collagen matrix, which occurs because of the action of endogenous enzymes such as matrix metalloproteinases (MMPs) and cysteine cathepsins [12,27]. The activation of these enzymes following acid exposure leads to the degradation of the organic matrix, resulting in increased tissue collapse and erosion [12,28]. Catechins in green tea, particularly epigallocatechin gallate (EGCG), have been shown to inhibit MMPs and enhance collagen cross-linking, thereby helping to maintain the integrity of the demineralized matrix and slow the progression of erosion [29, 30].

Besides enzymatic inhibition, polyphenols may also contribute to increased erosion resistance by interacting with salivary proteins. The acquired pellicle is an important factor because it acts as a diffusion barrier that limits acid penetration and mineral loss [14,31]. Polyphenolic compounds may bind to proteins within the acquired pellicle, thereby increasing its thickness, density, and structural integrity, which may improve its effectiveness as a barrier [32]. Experimental studies have shown that polyphenol-enriched pellicle surfaces reduce enamel and dentin surface softening following an acidic challenge, providing a plausible biological basis for the trends observed in laboratory and *in situ* studies [33]. The antioxidant activity of green tea catechins may also reduce the oxidation of organic material, thereby contributing indirectly to tissue preservation [8].

5.2. Comparison with existing literature

The results of the present umbrella review are also consistent with the broader preventive dentistry literature, which suggests that natural and plant-based compounds may offer adjunctive benefits in the management of dental erosion [3,34]. Several experimental studies have shown that polyphenol-based compounds, including grape seed extract, cranberry

Table 6
Overall methodological confidence of included systematic reviews.

Review	Overall AMSTAR-2 confidence	Key limitations
Memarpour 2025 [15]	High	None critical
Leal 2023 [22]	Moderate	No publication bias analysis
Seyedjavadi 2022 [16]	Low	No protocol, limited risk-of-bias assessment
Inchingolo 2023 [24]	Low	No duplicate screening, limited bias evaluation
Ruiz 2023 [24]	Low	No protocol, incomplete methodological reporting
Jaâfoura 2014 [17]	Critically low	Limited search, no bias assessment

extract, and green tea derivatives, can reduce dentin degradation and inhibit the enzymatic activity responsible for erosion [35,36].

However, the level of evidence supporting green tea-based interventions was found to be considerably lower than that supporting fluoride-based interventions. Fluoride, particularly stannous fluoride, has long been proven clinically effective in preventing erosive wear by promoting the formation of a protective surface layer and mineral precipitation [37,38]. The evidence supporting green tea-based interventions is derived primarily from *in vitro* and *in situ* studies, which, although valuable, may not fully represent the complex dynamics of the oral environment, including dietary practices, salivary flow rates, mechanical abrasion, and patient compliance [4].

The high degree of heterogeneity observed in the single quantitative meta-analysis further highlights the differences in the experimental conditions, which limit the generalizability of the findings. Variations in the concentration of green tea, application time, materials used, composition of the erosive solution, and the methods used to analyze the results also contribute substantially to the differences observed among the studies. A similar degree of heterogeneity has been reported in other systematic reviews of natural anti-erosive agents, indicating that this remains a broader challenge within this field of research [32].

6. CLINICAL IMPLICATIONS

From a clinical perspective, the findings of the present investigation indicate that green tea or green tea-derived formulations could be considered adjunctive preventive strategies rather than primary treatments for dental erosion. For example, green tea mouthrinses, gels, or polyphenol-containing dentifrices may provide supplementary benefits when used as adjuncts to conventional preventive regimens, particularly for patients with exposed dentin surfaces, high dietary acid consumption, or other conditions that may predispose them to erosive tooth wear.

However, clinicians should exercise caution when interpreting the results of laboratory studies and applying them to everyday clinical practice. For example, there is a lack of clinical trials evaluating the effectiveness of green tea-based formulations using validated erosive tooth wear endpoints. Therefore, green tea-based formulations may be considered as components of a broader preventive regimen that also includes conventional treatments, such as fluoride therapy, dietary modifications, salivary management, and behavioral interventions [39].

From a dietary perspective, it has been suggested that consuming plain green tea is unlikely to be inherently erosive because of its pH and titratable acidity, which are close to neutral compared with those of other acidic beverages, such as carbonated drinks and fruit juices [1]. However, it is important to educate patients that flavored and sweetened tea beverages may have increased acidity. Therefore, it is important to make this distinction and emphasize that patients should limit their consumption of acidic tea beverages and maintain proper oral hygiene practices after consuming acidic drinks.

The interpretation of the current findings may be influenced by the variation in the methodological quality of the included systematic reviews. The review by Memarpour et al. [15] was assessed as having a high level of confidence according to the AMSTAR-2 guidelines and provided the highest-quality evidence supporting a protective effect of green tea-derived compounds against dentin erosion. Several other systematic reviews included in this umbrella review were rated as having low or critically low confidence because of methodological limitations, including the absence of protocol registration, insufficient risk of bias assessment, non-duplicate screening, and inadequate clarity in the reporting of results. Therefore, the anti-erosive effects of green tea-derived compounds should be interpreted primarily on the basis of the high-quality evidence, whereas the findings from the lower-quality reviews should be considered exploratory.

7. STRENGTHS AND LIMITATIONS

One of the major strengths of the current umbrella review is the use of higher-order evidence synthesized using established methodologies. This was achieved by adhering to the PRISMA reporting guidelines and using the AMSTAR-2 appraisal criteria. This type of review is valuable for providing a comprehensive overview of the current evidence landscape.

However, it is important to note that the current review also had several limitations. First, the review was based on the findings of other systematic reviews, some of which included overlapping primary studies. This resulted in a substantial overlap of the evidence base. In addition, the current review demonstrated a high degree of heterogeneity among the experimental models, outcomes, and interventions, making it difficult to perform a quantitative synthesis of the systematic reviews. Moreover, the review included a large number of *in vitro* and *in situ* studies. These studies cannot be used to draw definitive conclusions regarding the multifactorial etiology of erosive tooth wear. Furthermore, the methodological quality of some of the included systematic reviews was poor because of the lack of protocol registration and the failure to perform a formal risk of bias assessment. Additionally, the review protocol was not prospectively registered in PROSPERO or any other international registry, which may limit methodological transparency

The corrected covered area (CCA) analysis showed considerable overlap among the systematic reviews included in the study (CCA = 32.5%), indicating that some systematic reviews contained overlapping primary studies. This suggests the potential for bias in the observed consistency of the protective effects, as the same experimental findings may have contributed to the evidence base across multiple systematic reviews rather than each review providing independent verification of the results. Therefore, the overlap should be taken into account when interpreting the consistency of the findings, particularly because the available literature is composed predominantly of *in vitro* and *in situ* studies.

8. FUTURE DIRECTIONS

Therefore, future investigations, particularly well-designed randomized controlled clinical trials, should evaluate the efficacy of green tea-based interventions using standardized and clinically relevant erosive wear outcome measures. Future studies should incorporate objective assessment tools, such as profilometric surface analysis, quantitative light-induced fluorescence, micro-computed tomography, three-dimensional intraoral scanning, optical coherence tomography, and validated erosive tooth wear indices, to improve the comparability and clinical applicability of the findings. Longitudinal studies with extended follow-up periods are also essential to determine whether the beneficial anti-erosive effects observed under laboratory and *in situ* conditions can be translated into measurable reductions in the progression of erosive tooth wear in real-world clinical settings.

Future clinical research should also focus on identifying the most effective delivery systems, concentrations, and application protocols for green tea-derived compounds. Comparative studies evaluating different formulations, such as mouthrinses, varnishes, gels, dentifrices, chewing gums, lozenges, slow-release systems, and bioadhesive preparations, may help establish the optimal delivery modality for maintaining prolonged contact with dental hard tissues and the acquired pellicle. Dose-response investigations are also necessary to determine the minimum effective concentrations and substantivity of catechins and epigallocatechin gallate (EGCG), while simultaneously evaluating the long-term safety, patient tolerance, and stability of these formulations under varying oral environmental conditions.

Further studies should also investigate the interactions between green tea polyphenols and conventional anti-erosive technologies, such as fluoride compounds, calcium-phosphate systems, hydroxyapatite-based agents, and bioactive glasses. Combination therapies may provide synergistic effects by simultaneously enhancing remineralization, reducing mineral solubility, and inhibiting the degradation of the organic matrix. Comparative effectiveness trials evaluating green tea-derived interventions alongside established fluoride-based preventive agents would also provide valuable insights into their relative and adjunctive clinical benefits.

Moreover, future investigations should target specific patient populations at increased risk of erosive tooth wear. These include adolescents and young adults with high acidic beverage consumption, patients with gastroesophageal reflux disease, eating disorders, xerostomia, reduced salivary flow, orthodontic appliances, exposed dentin surfaces, and occupational acid exposure. Stratifying outcomes according to patient risk profiles may improve the understanding of which populations are most likely to benefit from green tea-based preventive strategies.

Mechanistic studies exploring the biological pathways underlying the anti-erosive effects of green tea compounds are also warranted. Additional research focusing on acquired pellicle modification, inhibition of matrix metalloproteinases and cysteine cathepsins, collagen stabilization, antioxidant activity, and salivary interactions may further clarify the mechanisms responsible for tissue preservation. Such mechanistic evidence would strengthen the biological plausibility of the clinical findings and support the future development of evidence-based preventive formulations incorporating green tea-derived bioactive compounds for the management and control of erosive tooth wear.

9. CONCLUSION

This umbrella review compiles the latest findings from systematic reviews and meta-analyses on the potential role of green tea and its polyphenolic components in the prevention of dental erosion. The body of evidence suggests that green tea components may have beneficial effects in preventing tissue loss in dental hard tissues, particularly dentin, through potential mechanisms such as collagen stabilization, inhibition of proteolytic enzymes, and enhancement of acquired pellicle resistance. However, the quality of the evidence supporting these potential effects is limited because of the considerable heterogeneity among the studies, the predominance of *in vitro* and *in situ* studies, and the lack of well-designed clinical trials evaluating the efficacy of green tea components in the prevention of erosive tooth wear.

At present, green tea-derived compounds should be considered adjuncts to conventional fluoride-based preventive measures for dental erosion rather than replacements for them. Although *in vitro* and *in situ* studies have demonstrated promising protective effects, particularly against dentin erosion, the current evidence base remains limited because of methodological heterogeneity and the lack of well-designed clinical trials. Currently, green tea-derived compounds should be considered adjunctive preventive agents that may complement, rather than replace, conventional fluoride-based preventive strategies. Although *in vitro* and *in situ* studies have demonstrated promising protective effects against dentin erosion, the current evidence base remains limited because of methodological heterogeneity and the lack of well-designed clinical trials. Future research should focus on well-designed randomized clinical trials to evaluate the potential value of green tea-derived compounds in the prevention of dental erosion.

ORCID

Uzma Parveen Qureshi 0009-0001-8567-9838
Ladusingh Rajpurohit 0000-0001-7424-9755
Vini Mehta 0000-0003-4174-907X
Reshma Rameshrao Ghaytidak 0009-0008-4093-1607

REFERENCES

[1] Lussi A, Jaeggi T. Erosion--diagnosis and risk factors. *Clin Oral Investig.* 2008;12(Suppl 1). https://doi.org/10.1007/s00784-007-0179-z

[2] Salas MM, Nascimento GG, Huysmans MC, Demarco FF. Estimated prevalence of erosive tooth wear in permanent teeth of children and adolescents: An epidemiological systematic review and meta-regression analysis. *J Dent.* 2015;43(1):42-50. https://doi.org/10.1016/j.jdent.2014.10.012

[3] Schlueter N, Mulic A, Luka B. Global prevalence of erosive tooth wear. *Monogr Oral Sci.* 2025;33:45-71. https://doi.org/10.1159/000543785

[4] Shellis RP, Addy M. The interactions between attrition, abrasion and erosion in tooth wear. *Monogr Oral Sci.* 2014;25:32-45. https://doi.org/10.1159/000359936

[5] Chaussain C, Boukpessi T, Khaddam M, Tjäderhane L, George A, Menashi S. Dentin matrix degradation by host matrix metalloproteinases: Inhibition and clinical perspectives toward regeneration. *Front Physiol.* 2013;4:308. https://doi.org/10.3389/fphys.2013.00308

[6] Wiegand A, Attin T. Influence of fluoride on the prevention of erosive lesions--A review. *Oral Health Prev Dent.* 2003;1(4):245-253.

[7] Epple M, Enax J, Meyer F. Prevention of caries and dental erosion by fluorides: A critical discussion based on physico-chemical data and principles. *Dent J (Basel).* 2022;10(1):6. https://doi.org/10.3390/dj10010006

[8] Cabrera C, Artacho R, Giménez R. Beneficial effects of green tea--A review. *J Am Coll Nutr.* 2006;25(2):79-99. https://doi.org/10.1080/07315724.2006.10719518

[9] Narotzki B, Reznick AZ, Aizenbud D, Levy Y. Green tea: A promising natural product in oral health. *Arch Oral Biol.* 2012;57(5):429-435. https://doi.org/10.1016/j.archoralbio.2011.11.017

[10] Kushiyama M, Shimazaki Y, Murakami M, Yamashita Y. Relationship between intake of green tea and periodontal disease. *J Periodontol.* 2009;80(3):372-377. https://doi.org/10.1902/jop.2009.080510

[11] Hannig M, Hannig C. The pellicle and erosion. *Monogr Oral Sci.* 2014;25:206-214. https://doi.org/10.1159/000360376

[12] Kato MT, Leite AL, Hannas AR, Buzalaf MA. Gels containing MMP inhibitors prevent dental erosion *in situ*. *J Dent Res.* 2010;89(5):468-472. https://doi.org/10.1177/0022034510363248

[13] Hara AT, Zero DT. The potential of saliva in protecting against dental erosion. *Monogr Oral Sci.* 2014;25:197-205. https://doi.org/10.1159/000360372

[14] Lussi A, Carvalho TS. Erosive tooth wear: A multifactorial condition of growing concern and increasing knowledge. *Monogr Oral Sci.* 2014;25:1-15. https://doi.org/10.1159/000360380

[15] Memarpour M, Afzali Baghdadabadi N, Farzinnia G, Agharokh M, Mokhtari N, Bardideh E. Preventive and therapeutic effects of plant-derived compounds on tooth erosion: A systematic review and meta-analysis of *in situ* and *in vitro* studies. *Clin Exp Dent Res.* 2025;11(6). https://doi.org/10.1002/cre2.70235

[16] Seyedjavadi-Limoodi S, Moghaddasi N, Khosraviani F, Pouya S. Green tea may reduce dental caries and erosion: A systematic review. *Avicenna J Dent Res.* 2022;14(1).

[17] Jaâfoura S, Khemiss F, Kammoun D, Chebbi R, Baccouche C, Ghoul M. Dental erosion and tea: A systematic review. *Int J Sci Res.* 2014;3(11).

[18] Aromataris E, Fernandez R, Godfrey CM, Holly C, Khalil H, Tungpunkom P. Summarizing systematic reviews: Methodological development, conduct and reporting of an umbrella review approach. *Int J Evid Based Healthc.* 2015;13(3):132-140. https://doi.org/10.1097/XEB.0000000000000055

[19] Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R, Glanville J, Grimshaw JM, Hróbjartsson A, Lalu MM, Li T, Loder EW, Mayo-Wilson E, McDonald S, McGuinness LA, Stewart LA, Thomas J, Tricco AC, Welch VA, Whiting P, Moher D. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ.* 2021;372. https://doi.org/10.1136/bmj.n71

[20] Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, Moher D, Tugwell P, Welch V, Kristjansson E, Henry DA. AMSTAR 2: A critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ.* 2017;358. https://doi.org/10.1136/bmj.j4008

[21] Pieper D, Antoine SL, Mathes T, Neugebauer EAM, Eikermann M. Systematic review finds overlapping reviews were not mentioned in every other overview. *J Clin Epidemiol.* 2014;67(4):368-375. https://doi.org/10.1016/j.jclinepi.2013.11.007

[22] Leal IC, Rabelo CS, de Melo MAS, Silva PGB, Costa FWG, Passos VF. Polyphenols for preventing dental erosion in pre-clinical studies with *in situ* designs and simulated acid attack. *Planta Med.* 2023;89(11):1034-1044. https://doi.org/10.1055/a-2100-3542

[23] Inchingolo F, Dipalma G, Azzollini D, Trilli I, Carpentiere V, Hazballa D, Bordea IR, Palermo A, Inchingolo AD, Inchingolo AM. Advances in preventive and therapeutic

approaches for dental erosion: A systematic review. *Dent J (Basel).* 2023;11(12):274. https://doi.org/10.3390/dj11120274

[24] Ruiz DC, Marqués Martínez L, García Miralles E. Dental erosion and diet in young children and adolescents: A systematic review. *Appl Sci.* 2023;13(6):3519. https://doi.org/10.3390/app13063519

[25] Tjäderhane L, Nascimento FD, Breschi L, Mazzoni A, Tersariol IL, Geraldeli S, Tezvergil-Mutluay A, Carrilho M, Carvalho RM, Tay FR, Pashley DH. Strategies to prevent hydrolytic degradation of the hybrid layer—A review. *Dent Mater.* 2013;29(10):999-1011. https://doi.org/10.1016/j.dental.2013.07.016

[26] Chawhuaveang DD, Yu OY, Yin IX, Lam WYH, Chu CH. Topical agents for nonrestorative management of dental erosion: A narrative review. *Healthcare (Basel).* 2022;10(8):1413. https://doi.org/10.3390/healthcare10081413

[27] Tjäderhane L, Nascimento FD, Breschi L, Mazzoni A, Tersariol IL, Geraldeli S, Tezvergil-Mutluay A, Carrilho MR, Carvalho RM, Tay FR, Pashley DH. Optimizing dentin bond durability: Control of collagen degradation by matrix metalloproteinases and cysteine cathepsins. *Dent Mater.* 2013;29(1):116-135. https://doi.org/10.1016/j.dental.2012.08.004

[28] Buzalaf MA, Hannas AR, Kato MT. Saliva and dental erosion. *J Appl Oral Sci.* 2012;20(5):493-502. https://doi.org/10.1590/S1678-77572012000500001

[29] Dell'Aica I, Donà M, Sartor L, Pezzato E, Garbisa S. (-)-Epigallocatechin-3-gallate directly inhibits MT1-MMP activity, leading to accumulation of nonactivated MMP-2 at the cell surface. *Lab Invest.* 2002;82(12):1685-1693. https://doi.org/10.1097/01.LAB.0000043122.00384.91

[30] Bedran-Russo AK, Pauli GF, Chen SN, McAlpine J, Castellan CS, Phansalkar RS, Aguiar TR, Vidal CM, Napotilano JG, Nam JW, Leme AA. Dentin biomodification: Strategies, renewable resources and clinical applications. *Dent Mater.* 2014;30(1):62-76. https://doi.org/10.1016/j.dental.2013.10.012

[31] Flemming J, Hannig C, Hannig M. Caries management: The role of surface interactions in de- and remineralization processes. *J Clin Med.* 2022;11(23):7044. https://doi.org/10.3390/jcm11237044

[32] West NX, Joiner A. Enamel mineral loss. *J Dent.* 2014;42(Suppl 1). https://doi.org/10.1016/S0300-5712(14)50002-4

[33] Schestakow A, Rasputnis W, Hannig M. Effect of polyphenols on the ultrastructure of the dentin pellicle and subsequent erosion. *Caries Res.* 2024;58(2):77-85. https://doi.org/10.1159/000536199

[34] Magalhães AC, Moron BM, Comar LP, Wiegand A, Buchalla W, Buzalaf MA. Comparison of cross-sectional hardness and transverse microradiography of artificial carious enamel lesions induced by different demineralising solutions and gels. *Caries Res.* 2009;43(6):474-483. https://doi.org/10.1159/000264685

[35] Wang Y, Green A, Yao X, Liu H, Nisar S, Gorski JP, Hass V. Cranberry juice extract rapidly protects demineralized dentin against digestion and inhibits its gelatinolytic activity. *Materials (Basel).* 2021;14(13):3637. https://doi.org/10.3390/ma14133637

[36] de Paula DM, Lomonaco D, Parente da Ponte AM, Cordeiro KE, Magalhães Moreira M, Giovarruscio M, Sauro S, Pinheiro Feitosa V. Collagen cross-linking lignin improves the bonding performance of etch-and-rinse adhesives to dentin. *Materials (Basel).* 2022;15(9):3218. https://doi.org/10.3390/ma15093218

[37] Wiegand A, Attin T. Design of erosion/abrasion studies—Insights and rational concepts. *Caries Res.* 2011;45(Suppl 1):53-59. https://doi.org/10.1159/000325946

[38] Ganss C, Lussi A, Schlueter N. Dental erosion as oral disease: Insights in etiological factors and pathomechanisms, and current strategies for prevention and therapy. *Am J Dent.* 2012;25(6):351-364.

[39] Bartlett DW. The role of erosion in tooth wear: Aetiology, prevention and management. *Int Dent J.* 2005;55(4 Suppl 1):277-284. https://doi.org/10.1111/j.1875-595X.2005.tb00065.x

SUPPLEMENTARY

Table S1

Detailed electronic search strategies used across databases.

Database	Search strategy
PubMed/MEDLINE	(“Green Tea”[Mesh] OR “Camellia sinensis” OR “green tea” OR catechin* OR “epigallocatechin gallate” OR EGCG OR polyphenol* OR flavonoid*) AND (“Tooth Erosion”[Mesh] OR “dental erosion” OR “erosive tooth wear” OR “erosive wear” OR “tooth wear” OR enamel erosion OR dentin erosion) AND (“systematic review” OR “meta-analysis” OR umbrella review)
Scopus	TITLE-ABS-KEY (“green tea” OR “Camellia sinensis” OR catechin* OR EGCG OR polyphenol*) AND TITLE-ABS-KEY (“dental erosion” OR “erosive tooth wear” OR “tooth erosion” OR “dentin erosion” OR “enamel erosion”) AND TITLE-ABS-KEY (“systematic review” OR “meta-analysis” OR umbrella review)
Web of Science	TS=(“green tea” OR “Camellia sinensis” OR catechin* OR EGCG OR polyphenol*) AND TS=(“dental erosion” OR “erosive tooth wear” OR “tooth erosion” OR “dentin erosion” OR “enamel erosion”) AND TS=(“systematic review” OR “meta-analysis” OR umbrella review)
Embase	(‘green tea’/exp OR ‘Camellia sinensis’ OR catechin*:ab,ti OR EGCG:ab,ti OR polyphenol*:ab,ti) AND (‘tooth erosion’/exp OR ‘dental erosion’:ab,ti OR ‘erosive tooth wear’:ab,ti OR ‘dentin erosion’:ab,ti OR ‘enamel erosion’:ab,ti) AND (‘systematic review’/exp OR ‘meta analysis’/exp OR umbrella review:ab,ti)
Cochrane Library	(“green tea” OR “Camellia sinensis” OR catechin* OR EGCG OR polyphenol*) AND (“dental erosion” OR “erosive tooth wear” OR “tooth erosion” OR “dentin erosion” OR “enamel erosion”) AND (“systematic review” OR “meta-analysis” OR umbrella review)

Filters applied across databases included English language and review-level studies published up to December 2025. Search strategies were adapted according to the indexing system and syntax requirements of each database.