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Risk-Adapted Oral Care for Adults with Epilepsy: Integrating Hygiene Support, Medication Surveillance, Trauma Prevention and Oral Irrigation

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Abstract

Ulcerative Adults living with epilepsy face a combination of oral-health risks that cannot be managed by a single standard instruction. Recurrent seizures may cause orodental trauma; antiseizure medicines can produce oral adverse effects; functional limitations may complicate plaque control; and barriers to dental attendance can delay treatment. This narrative review integrates recent epidemiological, periodontal, pharmacovigilance and trauma evidence into a practical risk-adapted model of care. The model separates seizure-related danger, medication and mucosal findings, daily-care capacity, and access to professional services. Oral irrigation is considered an adjunct for selected patients rather than a replacement for toothbrushing or professional periodontal care. A tiered pathway is proposed to match caregiver involvement, preventive intensity, recall interval and escalation to the patient's changing risk profile.

Keywords: Epilepsy, oral health, preventive dentistry, risk assessment, antiseizure medication, oral irrigation, gingivitis, orodental trauma.

Introduction

Epilepsy affects about 50 million people worldwide and remains one of the most common chronic neurological disorders

[1]. Its dental consequences are often described as a list—trauma, caries, gingival enlargement, dry mouth—but a list does not explain why two patients with the same diagnosis may need entirely different care. One person may have well-controlled seizures and independent self-care; another may experience nocturnal generalized seizures, medication-related gingival changes, impaired dexterity and dependence on a caregiver. Risk is therefore created by the interaction of disease, treatment, function and access, not by the diagnostic label alone.

The modern definition and classification of epilepsy distinguish the disorder from a single provoked seizure and emphasize seizure type, epilepsy type and etiology [2] [3]. These distinctions matter in dentistry because the probability and pattern of injury, the need for supervision and the practical safety of treatment are influenced by seizure expression and control. Adult epilepsy is also commonly accompanied by psychiatric, cognitive and social burdens that can affect routines and attendance [4]. A useful dental plan must translate this neurological context into specific preventive decisions.

Purpose and Analytical Approach

This review aims to construct a clinically usable framework for risk-adapted oral care in adults with epilepsy. It brings together observational studies of oral status, systematic reviews of caries and trauma, pharmacovigilance evidence, and controlled studies of interdental cleaning and oral irrigation. Because much of the epilepsy-specific literature is cross-sectional, associations are not presented as proof of causation. The practical question throughout is narrower and more defensible: which finding should change prevention, monitoring, support or referral for the individual patient?

Why A One-Size-Fits-All Message Fails

Recent evidence shows substantial unmet oral-health need. In a 2026 analytical study, poor oral hygiene was recorded in 85.7% of adults with epilepsy compared with 27.1% of controls; gingivitis affected 71.4% and 57.9%, respectively [5]. A clinical survey from India likewise found a considerable burden of untreated dental and soft-tissue disease [8]. A 2025 systematic review and meta-analysis reported worse caries experience in people with epilepsy, although heterogeneity across populations and methods was marked [9]. These findings justify active prevention, but they do not imply that every patient requires the same device, recall interval or level of supervision.

Behavior and access provide part of the explanation. In a study of 875 people with epilepsy in rural China, 65.8% reported brushing at least once daily, more than 70% brushed for less than three minutes, and only 9.1% had attended a dentist during the previous year [6]. In refractory epilepsy, higher seizure frequency was associated with poorer oral hygiene and more periodontal disease [7]. National survey data also document barriers to health-care access among adults with epilepsy [14]. The direction of these relationships is complex: severe epilepsy can impair self-care and attendance, while poverty, stigma and comorbidity can worsen both neurological and dental outcomes.

Table 1. Risk domains that should shape an oral-care plan

Risk domain	What to assess	How the finding changes care
Seizure and trauma	Seizure type and frequency, falls, nocturnal events, prior lip, tongue or tooth injury	Adds trauma counselling, emergency readiness and closer review after uncontrolled or changing seizures
Medication and mucosa	Current and previous medicines, dose changes, dry mouth, ulcers, gingival enlargement, bleeding	Prompts a medication–time line, phenotype documentation and liaison with the prescriber when clinically significant
Hygiene and function	Plaque, gingival bleeding, dexterity, cognition, fatigue, swallowing and ability to follow a sequence	Determines brush design, interdental method, caregiver involvement and the complexity of instructions
Disease activity	New caries, periodontal pockets, active pain, broken restorations and recurrent infection	Raises preventive intensity and converts a routine recall into active treatment
Access and participation	Dental anxiety, transport, cost, missed visits, caregiver availability and patient priorities	Favors shorter achievable appointments, coordinated visits and a plan that can be sustained outside the clinic

Note: Risk domains should be reviewed after a major seizure change, a new antiseizure medicine, oral surgery, loss of a caregiver or a decline in daily function.

Building the Daily-Care Foundation

The core of prevention remains twice-daily plaque removal with fluoride toothpaste. The technique should be simplified before it is intensified. A powered brush may help when manual dexterity is limited, but only if the patient tolerates vibration and can position the head safely. A large handle, a stable seated position, a visual sequence and caregiver cueing are often more useful than adding several products at once. If another person provides care, consent, comfort and the least restrictive assistance remain essential.

Interdental cleaning should match anatomy and ability. Interdental brushes may be easier than floss in open embrasures; floss can remain appropriate where contacts are tight and hand control is good. The Cochrane review of home interdental devices found that some adjuncts can reduce gingivitis, but the certainty and consistency of evidence vary by device and outcome [15]. Therefore, the best method is not simply the one with the largest theoretical effect. It is the method that reaches the relevant surfaces, is used without injury and survives ordinary daily life.

Table 2. Preventive tools: potential value, limitations and patient selection

Tool or action	Potential value	Important limitation	Best fit
Fluoride toothbrushing	Primary plaque disruption and caries prevention	Technique and regularity determine benefit	Every patient, with adapted handle or caregiver support when required
Interdental brush or floss	Cleans proximal sites missed by a toothbrush	Incorrect size or technique can injure tissue; floss demands dexterity	Method selected by embrasure size and functional ability
Oral irrigator	May reduce gingival bleeding and inflammation as an adjunct	Does not replace mechanical brushing or remove calculus	Patients who can handle the device safely and struggle with conventional interdental care
Professional prevention	Removes calculus, corrects retentive factors and reinforces technique	Benefit fades without feasible home care and follow-up	Active gingivitis, periodontal risk, drug-influenced gingival change or repeated treatment need
Medication surveillance	Links oral changes to dose and timing and identifies urgent reactions	Spontaneous safety signals do not prove causation	New mucosal lesions, dry mouth or gingival enlargement after a treatment change

Oral Irrigation: What the Evidence Does and Does Not Show

Oral irrigators deliver a pulsating water stream along the gingival margin and between teeth. Randomized trials in general dental populations have reported reductions in bleeding and gingival inflammation when irrigation is added to toothbrushing. In a 2023 trial, oral irrigation produced greater improvements in several inflammatory measures than the comparison regimen [16]. Another four-week randomized trial found larger reductions in bleeding on probing and modified gingival index with water flossing, while the difference in plaque reduction was smaller [17]. This pattern is clinically plausible: irrigation may influence the inflammatory environment even when visible plaque scores change modestly.

The evidence must be transferred to epilepsy care with restraint. Trials were not designed specifically around seizure frequency, cognitive impairment or caregiver-delivered use. A 2024 scoping review found a broad but methodologically varied literature on oral irrigation devices [18]. It is reasonable to offer irrigation as an adjunct when conventional interdental cleaning is not feasible, but it is not reasonable to claim an epilepsy-specific effect that has not been tested. Safe use means a low initial pressure, a stable position over the sink, a systematic route, and use at a time when the person is fully alert. The device should not be used during an aura, immediately after a seizure, or by a person who cannot control the handle without direct assistance.

Medication Surveillance Without Unsafe Attribution

Antiseizure medicines can be associated with dry mouth, ulceration, gingival enlargement and other oral events, but the presence of a symptom does not identify its cause. Analysis of the US FDA Adverse Event Reporting System found different oral safety signals across 16 antiseizure medicines; for example, reports involving pregabalin often included dry mouth, whereas lamotrigine was linked with ulcerative or erosive events and

phenytoin with gingival enlargement [10]. Such databases are valuable for signal detection, yet they are affected by selective reporting, concomitant treatment and the absence of reliable exposure denominators.

A dental medication review should therefore be a time line rather than a list. The record should include the date a medicine was started, dose changes, the onset and distribution of the oral finding, and its response to local care. Gingival enlargement is influenced by plaque and inflammation as well as drug exposure; an anticonvulsant-treated cohort demonstrated the importance of inflammatory factors [11]. The first response is usually to document the phenotype, reduce local inflammation and discuss severe or progressive findings with the neurologist. Abrupt withdrawal of antiseizure treatment is unsafe and lies outside dental decision-making.

Trauma Prevention and Emergency Readiness

Seizure-related injury is not a theoretical concern. A systematic review and meta-analysis found an association between epilepsy and oral-maxillofacial trauma, with an estimated injury prevalence of 19% and substantially higher odds than in people without epilepsy [13]. A newer meta-analysis reported pooled estimates of 20% for traumatic dental injury, 25% for soft-tissue injury and 14% for hard-tissue injury; the tongue and lips were frequently affected [12]. Variation across studies is substantial, but the direction is consistent: uncontrolled seizures and a history of injury warrant explicit preventive discussion.

Prevention begins with seizure management by the neurological team, removal of obvious oral hazards and timely repair of sharp or unstable teeth. During a convulsive seizure, bystanders should protect the person from surrounding hazards, time the event and place the person on the side when feasible after convulsions cease. Nothing should be forced into the mouth and the jaw should not be restrained. After an event, new tooth mobility, altered bite, persistent bleeding, deep laceration or suspected jaw fracture requires prompt assessment. A routine dental note should also record the patient's usual seizure pattern, rescue plan and emergency contact.

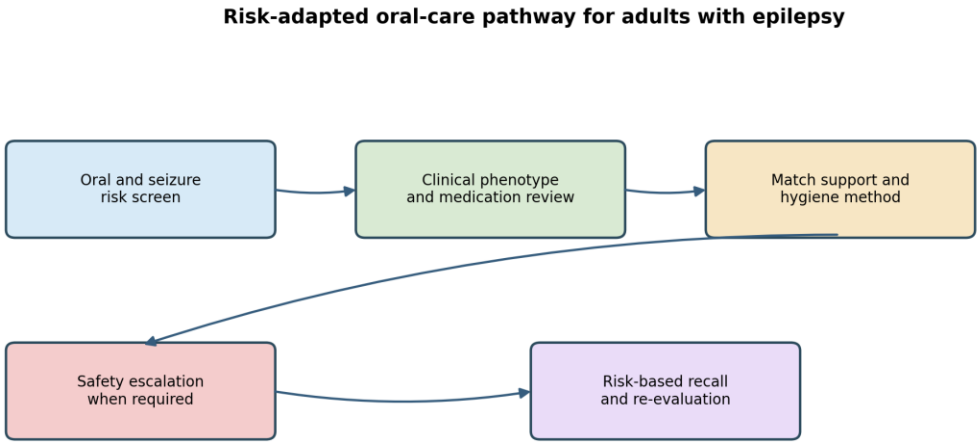

Figure 1. Risk-adapted oral-care pathway for adults living with epilepsy.

Author synthesis based on the evidence reviewed in this article.

A Tiered, Reassessable Care Pathway

Risk adaptation is not a permanent label. A patient may move from low to high risk after a cluster of seizures, a medication change, loss of caregiver support or the appearance of active periodontal disease. Conversely, improved seizure control, stable gingival health and a workable home routine may permit a less intensive schedule. The purpose of tiers is to make the reasons for care visible, not to ration attention.

Table 3. Illustrative risk tiers and corresponding preventive intensity

Tier	Typical profile	Home-care support	Professional follow-up and escalation
Low	Stable seizure control, no recent injury, independent effective hygiene, no active oral disease	Standard fluoride brushing and individually selected interdental care	Routine recall based on caries and periodontal status; re-screen after neurological or medication change
Moderate	Occasional seizures, early gingivitis, dry mouth, modest dexterity or adherence difficulty	Simplified sequence, adapted brush, selected adjunct; caregiver cueing if accepted	Shorter review interval, professional plaque control, medication and mucosal recheck
High	Frequent generalized seizures, previous dental trauma, progressive gingival enlargement, active disease or dependent care	Direct caregiver assistance, limited essential steps, device use only when safely controlled	Coordinated dental–neurology care, active treatment, trauma plan and prompt reassessment after change

Note: The table is a clinical decision aid, not a validated prediction score. Individual disease activity and patient preference remain decisive.

Person-Centred Outcomes and Shared Decisions

Success cannot be reduced to a plaque score. Pain-free eating, confidence in speaking, the ability to tolerate care, reduced caregiver burden and the absence of traumatic emergencies may be equally important. Oral-health-related quality of life can be measured with tools such as OHIP-14 [19], but even a validated questionnaire should support rather than replace conversation. The patient's priorities determine which change is worth sustaining.

Shared decisions are particularly important when the "ideal" regimen is unrealistic. Three well-performed steps are better than a complex sequence that is abandoned. The clinician should identify one or two modifiable risks, demonstrate the technique, ask the patient or caregiver to show it back, and document what was actually agreed. At the next visit, the plan is judged by clinical response and feasibility rather than by compliance language.

Discussion

The strength of a risk-adapted model lies in integration. Seizure control alone does not reveal plaque burden; a gingival index alone does not reveal medication timing; and recommending an irrigator does not solve problems of access, cognition or untreated calculus. Combining neurological history, oral phenotype, functional capacity and social context creates a plan that is both safer and more credible.

The main limitation is the evidence base itself. Many epilepsy-specific oral-health studies are observational, use different outcome definitions and recruit from selected clinical populations. Trials of oral irrigation and interdental devices largely involve people without epilepsy. Accordingly, the proposed tiers are a clinical synthesis rather than a validated scoring system. Their value is in structuring judgement and making reassessment explicit; future prospective research should test whether this approach improves disease, injury and quality-of-life outcomes.

Conclusion

Oral care for adults with epilepsy should be matched to risk rather than delivered as a uniform instruction. A complete assessment brings together seizure pattern and injury history, current medicines and mucosal findings, plaque and disease activity, daily-care capacity and access to professional care. Toothbrushing with fluoride toothpaste remains foundational; interdental methods and oral irrigation are selected as adjuncts according to anatomy, ability and safety. Medication-related findings require a documented time line and collaboration with the prescriber, while recurrent seizures require trauma planning and emergency readiness. Regular reassessment allows preventive intensity to change with the patient's clinical and functional circumstances.

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