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[Ziad D. Baghdadi](#) *

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Communication

Preservation-to-Precision in Severe-ECC: When “Buying Time” Must Not Become “Selling Time

Ziad D Baghdadi ^{1,2,3}

- ¹ Centre for Community Oral Health, Gerald Niznick College of Dentistry, University of Manitoba, Winnipeg, MB R3B 0L8, Canada; ziad.baghdadi@usask.ca
- ² Department of Preventive Dental Sciences, Division of Pediatric Dentistry, Dr. Gerald Niznick College of Dentistry, University of Manitoba, Winnipeg, MB R3E 0W2, Canada
- ³ TopSmiles Pediatric Dentistry and Orthodontics, Winnipeg, MB R2M 3A4, Canada

Abstract

Severe early childhood caries (S-ECC) in 3–4-year-olds is a preventable disease with consequences that extend beyond teeth to sleep, nutrition, development, family stability, and long-term health. In a high-income country such as the United States, the central clinical and ethical challenge is not whether minimally invasive dentistry (MID)—including silver diamine fluoride (SDF)—can be used, but whether it is used with appropriate precision and within a system capable of delivering timely definitive care. This editorial argues for a Preservation-to-Precision movement that transcends “MID” as a narrow technical identity and instead prioritizes child well-being as the endpoint: freedom from pain and infection, durable function, and acceptable psychosocial outcomes. Published evidence supports SDF/MID as an evidence-based tool for lesion arrest and as an interim strategy that can alter care pathways and, in some contexts, delay escalation to sedation/general anesthesia by weeks to months; however, real-world data also show that many SDF-treated primary teeth receive subsequent treatment within two years, underscoring that “buying time” is not synonymous with securing long-term outcomes to exfoliation. The editorial cautions against redefining temporization as a universal protocol and calls for rights-aligned, risk-based precision: tooth- and child-specific planning, realistic appraisal of follow-up feasibility, and system reforms that ensure timely access to definitive restorative care when indicated.

Keywords: severe early childhood caries; preservation-to-precision; minimally invasive dentistry; silver diamine fluoride; caries management pathway; pediatric dental access; general anesthesia; health equity; children’s rights; preventive dentistry

A 3-year-old with severe early childhood caries (S-ECC) is not presenting with a “dental issue.” They are presenting with a preventable, progressive disease that can disrupt sleep, eating, growth, learning, and family stability. The American Academy of Pediatric Dentistry (AAPD) defines severe ECC using clear clinical thresholds and explicitly links ECC to downstream harms, including hospitalizations/ER visits, high treatment costs, lost school days, diminished ability to learn, nutritional deficiencies, and reduced oral health-related quality of life. [1]

In a wealthy, technologically advanced country such as the United States, the recurring question is not whether we *can* do better—it is why we so often don’t, especially for the children least able to advocate for themselves.

This editorial reframes the debate through a Preservation-to-Precision lens—one that transcends the narrow boundaries of “MID” (minimally invasive dentistry) by insisting that minimal invasiveness is not the endpoint. Child well-being is.

1. What Does “Preservation-to-Precision” Mean in Severe ECC

Preservation is broader than “avoid the drill.”

Preservation includes conserving tooth structure when appropriate—but it also includes preserving:

- the child's comfort and emotional safety,
- the family's capacity to follow through,
- and the child's chance at a stable health trajectory, not repeated cycles of crisis.

For severe ECC, preservation cannot be reduced to “do less dentistry.” In a 3–to 4-year-old, many primary teeth are expected to remain functional for years. A temporizing plan that repeatedly “buys time” but does not reliably deliver health can unintentionally convert disease management into disease endurance.

Precision is “right care, right tooth, right child, right time, right setting.”

Precision in caries care is not a slogan; it is a discipline. Frameworks like the International Caries Classification and Management System (ICCMS) emphasize staging disease, assessing risk, and selecting non-operative care for earlier lesions and conservative operative care for more extensive lesions, aiming to preserve tooth structure and achieve health outcomes rather than simply perform procedures. [4]

In severe ECC, precision means making explicit decisions about:

- tooth prognosis and remaining lifespan,
- family feasibility (especially recall reliability),
- child behavior and trauma-informed care needs,
- access to sedation/GA when chairside treatment cannot be humane or safe,
- and the ethical boundary between interim stabilization and avoidable prolonged suffering.

2. What Evidence-Based Guidelines Actually Support—and What They Do not

2.1. Nonrestorative Therapies (Including SDF) are Evidence-Supported, Within a Plan

The ADA's evidence-based guideline on nonrestorative treatments evaluated randomized trials and issued lesion- and surface-specific recommendations; among “most effective interventions,” it includes 38% silver diamine fluoride (SDF) and sealants, alongside fluoride varnish and high-fluoride toothpaste regimens. [2]

AAPD similarly states that 38% SDF is effective for arrest of cavitated caries lesions in primary teeth and notes it may be used as part of an ongoing caries management plan within a dental home. [1]

Neither guideline supports the overreach of declaring SDF/MID a new long-term protocol for all children with severe ECC, regardless of severity, recall feasibility, or tooth longevity. The evidence base is strongest for arresting lesions, not for guaranteeing long-term function, form, esthetics, or tooth survival to exfoliation in high-burden severe ECC without eventual definitive care.

2.2. Restorative Care Is also Evidence-Supported, and Conservative Approaches Are Emphasized

The ADA's restorative guideline for moderate and advanced cavitated lesions recommends (conditionally) more conservative carious tissue removal approaches, especially for advanced lesions, and concludes that including direct restorative materials may be effective for vital primary and permanent teeth. [3]

This matters because the false dilemma—“MID versus crowns”—misses the point. The evidence-based position is precision staging: some lesions are appropriate for nonrestorative arrest strategies; others require durable restoration to deliver health.

3. What the Published Real-World Evidence Says About “Buying Time” with SDF—and how to Interpret it Without Inflation

A frequent claim in severe-ECC care is that SDF/MID can “buy time” until a child can tolerate definitive treatment, prevention takes hold, or access barriers resolve. The published evidence

supports a limited version of that claim—but does not justify turning temporization into long-term substitution.

3.1. Private Practice Cohort Evidence: SDF Shifts Downstream Utilization (Short Term)

In a two-dentist private pediatric practice retrospective matched cohort, children receiving SDF (matched on age, demographics, insurance, cooperation, and dmft) had more dental visits, fewer restorations, and lower restorative and overall expenditures over one year compared with those not receiving SDF; the SDF group also more frequently received care under GA. [5]

How to use this responsibly: it supports the statement that SDF is functioning in real private practice as an adjunct that changes the treatment pathway—often requiring monitoring/re-visits and sometimes coexisting with GA care. It does not prove that SDF prevents GA, prevents infection, or ensures multi-year tooth success.

3.2. Private Dental Claims (≥ 24 Months): Many SDF-Treated Primary Teeth still Need Further Treatment

A large private insurance claims study of SDF-treated primary teeth followed for at least 24 months found that 40% of teeth initially treated with SDF received additional treatment; odds of future treatment decreased with child age. [6]

Why this matters for severe ECC at age 3–4: Many of these children's teeth must function for years. A 40% rate of additional treatment over ~2 years is consistent with clinical intuition that SDF often serves as a staging marker, not a definitive endpoint—especially when tooth longevity demands durable solutions.

3.3. Time-to-Event Evidence: SDF is Associated with Delays to Sedation/GA Among Those who Ultimately Undergo Sedation/GA

In a retrospective cohort of privately insured young children who ultimately had a sedation/GA claim, SDF exposure was associated with a longer time to first sedation/GA encounter—reported increases of 63 days (different dentists) and 91 days (same dentist), after adjustment for age, sex, and region. [7]

The non-inflated interpretation: SDF may, in some contexts, delay a sedation/GA episode among children who ultimately need it. That is a plausible “buy time” benefit—but it is measured in weeks to months, not in “years to exfoliation,” and it does not establish that children were pain-free or infection-free while waiting.

3.4. Community Clinic Naturalistic Survival Analysis: Survival Is Meaningful, Variable, and not a Guarantee

A naturalistic community dental clinic study using survival analysis reported 76% overall survival for SDF alone, with survival varying by tooth type and patient age; it also found very different outcomes when SDF was paired with sedative fillings or restorations (differences likely reflecting treatment intent and case selection). [8]

Relevance to severe-ECC: survival metrics suggest SDF can be clinically effective, but they also underscore variability—and the need for precision about *which teeth*, *which children*, and *what the follow-up plan is*.

3.5. A Crucial Clinical Truth: SDF Does not Rebuild Teeth—and Is Often Used to Halt Progression Until Cooperation/Definitive Access Is Possible

A study of parental treatment decisions in a multi-center private pediatric practice notes plainly that SDF does not restore missing tooth structure and is often used to halt progression until a child can cooperate for conventional treatment or when delays (including long waitlists) are unavoidable. [9]

This is the heart of the editorial dilemma: SDF can be the right bridge—but a bridge must lead somewhere.

4. The Ethical Line: “Bridge” Versus “Destination” in a Rich Country

Severe-ECC forces a system-level question: *What does an advanced health system owe a 3-year-old with a treatable disease?*

Even outside legal debate, the moral standard is widely articulated. The UN Convention on the Rights of the Child states that the best interests of the child should be a primary consideration in actions concerning children and that states should ensure children receive protection and care necessary for their well-being. [12] [OHCHR](#) It also recognizes the child’s right to the highest attainable standard of health and to facilities for the treatment of illness, striving to ensure that no child is deprived of access to such services. [12] [OHCHR](#) and UNICEF note that the U.S. remains the only country that has not ratified the CRC (while having signed it), underscoring the “rights gap” as a policy posture, even if clinical ethics remain compelling. [13]

A rights-respecting severe-ECC pathway cannot accept a default where toddlers “wait with disease” simply because the system is misaligned.

5. The U.S. Access Problem: When Definitive Care Is Delayed, Children Pay the Price

One of the most important reasons MID becomes over-relied upon in severe ECC is access, not clinical philosophy.

AAPD’s policy brief on operating room access describes denial of hospital OR time for pediatric dental care as a growing problem in the U.S., citing financial pressures that drive hospitals to prioritize better-reimbursed medical procedures, displacing dental cases. [10]

In peer-reviewed literature, a national survey study reports that pediatric dentists have described denial of OR access for GA, resulting in long waiting times, deferral of medically necessary care, and unmeasured pain and anxiety for patients. [11]

In this context, it is ethically seductive—but dangerous—to rebrand constrained access as “a protocol.” MID may be the only realistic immediate option in many settings, but when that reality becomes normalized, the system quietly shifts from care delivery to care deferral.

6. A Preservation-to-Precision Pathway for the 3–4-Year-Old with S-ECC

What would an evidence-respecting, rights-aligned, clinically realistic pathway look like?

Step 1: Immediate preservation (stabilize disease, reduce suffering, prevent catastrophe)

Use evidence-supported nonrestorative and preventive interventions (including SDF where appropriate) to arrest lesions and reduce risk, consistent with ADA and AAPD guidance. [1,2]

But define clearly what “stabilize” means in your clinic: pain status, infection indicators, caregiver capacity, and recall timing.

Step 2: Precision triage (don’t treat “S-ECC” as one entity)

Apply structured staging and risk frameworks (ICCMS logic) to decide what is:

- suitable for ongoing nonrestorative management,
- suitable for micro-/minimally invasive interim restorations,
- and what requires durable definitive restoration soon (often posterior teeth with long remaining lifespan). [4]

Step 3: Plan the bridge destination (durability when durability is needed)

Real-world evidence shows that a sizable portion of SDF-treated teeth need additional treatment within a couple of years, and that SDF often shifts utilization rather than “solving” severe ECC outright. [5,6]

So, for teeth expected to function for years, the plan should frequently include a timely transition to durable restorations (e.g., SSCs/other full-coverage restorations when indicated), supported by evidence-based restorative approaches. [3]

Step 4: System precision (the part dentistry can't solve alone)
If SDF can delay sedation/GA by weeks to months, that is only beneficial if the system uses the time to move toward definitive care, not simply extend waiting. [7]

A Preservation-to-Precision movement therefore has to be partly a policy movement: reimbursement, workforce capacity, and hospital/ASC access must align with children's needs.

7. What We Should Stop Claiming—and What We Should Start Proving

Stop claiming that MID/SDF protocols alone can reliably secure function, form, and esthetics until exfoliation for severe ECC in toddlers. The evidence does not establish that, and published data show substantial subsequent treatment needs and pathway complexity. [5–8]

- Start proving (research priorities):
- tooth-level survival to exfoliation in high-risk severe-ECC cohorts,
 - patient-centered outcomes (pain, sleep, infection episodes, quality of life),
 - equity outcomes (who gets definitive care, who gets “bridges forever”),
 - and system outcomes (wait times, GA capacity, cost tradeoffs).
- A wealthy country should not confuse the availability of a useful interim tool with the fulfillment of its obligation to deliver health.

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