EdgeEndo has been part of a broader shift toward biologically driven dentistry. By developing modern NiTi instrumentation and advanced calcium silicate materials, the company focuses on technologies that support procedures commonly performed in general practice, including root canal therapy, pulpotomy, pulp capping, and select cases of apexification. These innovations are designed to simplify clinical workflows while supporting the biologic goals of treatment—preserving vitality, promoting healing, and improving long-term predictability. Equally important, EdgeEndo has emphasized making these technologies accessible, allowing clinicians to adopt contemporary materials and techniques without the high cost often associated with newer endodontic systems. In this way, advances in biomaterials are not only improving outcomes, but also making modern vital pulp therapy more practical in everyday practice.

The Evolution of PULPOTOMY MEDICAMENTS

BY DR. CARLA COHN

For many of us, pulp therapy in the primary dentition was something we learned early in training and then carried into practice with relatively little change. The protocols were familiar. The materials were familiar. For a long time, that felt sufficient. But pediatric pulp therapy has entered a different era. Advances in biomaterials and a stronger evidence base now invite us to reexamine not only what we use, but why we use it.

The conversation today is centered on biology. We understand more about pulp healing, inflammation, and the importance of a durable coronal seal than ever before. Updated guidance from organizations such as the American Academy of Pediatric Dentistry reflects this shift, emphasizing vital pulp therapy with materials that demonstrate consistent clinical and radiographic success. This is not simply a matter of replacing one medicament with another. It is a broader rethinking of how we approach the preservation of vitality in primary teeth.

Looking back, the evolution of pulpotomy materials tells a clear story. Calcium hydroxide was introduced nearly a century ago and was widely embraced because of its high pH and antibacterial properties. It made biologic sense on paper. However, long-term results in primary teeth often revealed internal root resorption and unpredictable outcomes. What initially appeared promising did not consistently translate into durable success. Formocresol followed and, for decades, became the gold standard. Its clinical success rates were strong, and it was straightforward to use. Many clinicians built entire treatment philosophies around it. Yet formocresol functions by devitalizing tissue rather than supporting regeneration. As concerns about formaldehyde exposure grew, especially after its classification as a known human carcinogen by the U.S. Department of Health and Human Services in 2011, the profession began to question whether high success rates alone were enough. Considerations of systemic safety and potential effects on developing succedaneous teeth could no longer be dismissed.

Ferric sulfate emerged as a hemostatic alternative that avoided formaldehyde. It was simple, efficient, and initially reassuring. However, longer-term follow-up revealed a high incidence of internal resorption and radiographic failure. Although it represented progress in terms of safety perception, it did not fully satisfy the desire for a biologically harmonious solution.

The real turning point came in the 1990s with the introduction of mineral trioxide aggregate (MTA). MTA reframed the pulpotomy conversation. Rather than devitalizing tissue, it supported healing. Its sealing ability, sustained alkalinity, calcium ion release, and stimulation of

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dentin bridge formation aligned with regenerative principles. Over time, systematic reviews and meta-analyses demonstrated that MTA consistently outperformed calcium hydroxide and compared favorably, often superiorly, to formocresol and ferric sulfate. For many, it became the contemporary benchmark. Yet MTA was not without limitations. Long setting times, handling challenges, risk of discoloration, and higher cost created friction in everyday clinical workflows. In a busy pediatric setting, practicality matters. The next generation of calcium silicate materials sought to preserve the biologic advantages of MTA while improving ease of use.

Today, newer tricalcium and dicalcium silicate cements demonstrate high success rates and more manageable handling properties.

Even more recently, EdgeUtopia Root Repair Material (RRM) was developed and introduced to the profession. EdgeUtopia Root Repair Material is a premixed, monodose calcium silicate repair material that has further simplified placement. It has a putty consistency, can be dispensed directly into the pulp chamber with a controlled applicator, placed in a 3–4 mm thickness over the canal orifices, and allowed to set in the presence of moisture. The reported initial setting time ranges from approximately 30 to 120 minutes, depending on environmental conditions, yet definitive restoration does not need to be delayed.

Edge Utopia RRM is "new" due to the novel delivery mechanism which ensures optimal handling and consistency (most premixed putty RRMs dry out quickly after initial use). However, the actual material has been used clinically for over 10 years and multiple studies have shown it to be osteogenic, antibacterial, hydrophilic, radiopaque and non-shrinking. I would encourage the reader to review the extensive research bibiliography[1] as not all brands of CaSi repair materials are the same and some lack fundamental evidence. The product is approved for the following clinical applications (pulpotomy, apexification, apexogenesis, resorptive defect repair, retrofilling of apico preparations, and perforation repair). In my clinical practice, I find it very easy to use and have had excellent results.

Equally important is the restorative protocol that accompanies pulpotomy. Current recommendations for primary molars favor full-coverage restorations, typically stainless steel crowns or aesthetic full-coverage alternatives. When workflow is thoughtfully organized, efficiency and biology can coexist. Crown preparation can be completed first, caries excavation performed, hemostasis achieved, the calcium silicate material placed, and the crown cemented in the same visit. Moisture within the tooth supports the setting reaction of the material beneath the crown. The procedure becomes streamlined without sacrificing biologic integrity.

What is most striking about these changes is not simply the improvement in materials. It is the philosophical shift. Pulpotomy in the primary dentition is no longer viewed merely as a way to maintain a tooth until exfoliation. It is increasingly regarded as a regenerative procedure grounded in preserving vitality and supporting natural healing. As clinicians, we are called to periodically reassess our habits. Comfort with a technique does not guarantee that it reflects current evidence. The evolution of pulpotomy materials reminds us that pediatric dentistry, like all areas of health care, advances when we are willing to adapt. Today, vital pulp therapy in primary teeth can be more predictable, more efficient, and more biologically respectful than at any point in our professional history.

Reference

1. *https://edgeendo.com/wp-content/uploads/2025/10/EdgeUtopia-RRM-Research-Chart-2025.pdf*

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