

# Effectiveness of a resin-modified glass ionomer liner in reducing hypersensitivity in posterior restorations

A study from the Practitioners Engaged in Applied Research and Learning Network

**Brad Strober, DMD; Analia Veitz-Keenan, DDS; Julie Ann Barna, DMD; Abigail G. Matthews, PhD; Donald Vena, BS; Ronald G. Craig, DMD, PhD; Frederick A. Curro, DMD, PhD; Van P. Thompson, DDS, PhD**

**T**he Practitioners Engaged in Applied Research and Learning (PEARL) Network is a Good Clinical Practice–based research network whose members, identified as practitioner-investigators (P-Is), voted to conduct a two-armed, randomized comparative effectiveness study to determine whether adding a resin-modified glass ionomer (RMGI)

liner eliminates or reduces postoperative hypersensitivity (POH) in dentin-bonded Class I or Class II resin-based composite (RBC) restorations, as well as to identify

other factors (putative risk factors) associated with increased POH.

**Postoperative hypersensitivity.** POH is defined as pain associated with mastication or sensitivity to heat, cold and sweet foods or beverages that is present at one week or more after treatment and related to the tooth's having undergone restoration. (Pain that occurs during clenching only, indicating a restoration in hyperocclusion, usually is excluded from the definition of POH.) This sensitivity can be measured clinically, by the participant's own report (best done anonymously via survey) or both, and results of these measures have been shown to correspond.<sup>1</sup>

Managing POH can be an especially taxing proposition for clini-

## ABSTRACT

**Background.** The objectives of this randomized comparative effectiveness study conducted by members of the Practitioners Engaged in Applied Research and Learning (PEARL) Network were to determine whether using a resin-modified glass ionomer (RMGI) liner reduces postoperative hypersensitivity (POH) in dentin-bonded Class I and Class II resin-based composite (RBC) restorations, as well as to identify other factors (putative risk factors) associated with increased POH.

**Methods.** PEARL Network practitioner-investigators (P-Is) (n = 28) were trained to assess sensitivity determination, enamel and dentin caries activity rankings, evaluation for sleep bruxism, and materials and techniques used. The P-Is enrolled 341 participants who had hypersensitive posterior lesions. Participants were randomly assigned to receive an RBC restoration with or without an RMGI liner before P-Is applied a one-step, self-etching bonding agent. P-Is conducted sensitivity evaluations at baseline, at one and four weeks after treatment, and at all visits according to patient-reported outcomes.

**Results.** P-Is collected complete data regarding 347 restorations (339 participants) at baseline, with 341 (98 percent) (333 participants) recalled at four weeks. Treatment groups were balanced across baseline characteristics and measures. RBC restorations with or without an RMGI liner had the same one-week and four-week POH outcomes, as measured clinically (by means of cold or air stimulation) and according to patient-reported outcomes.

**Conclusions.** Use of an RMGI liner did not reduce clinically measured or patient-reported POH in moderate-depth Class I and Class II restorations. Cold and air clinical stimulation findings were similar between groups.

**Practical Implications.** The time, effort and expense involved in placing an RMGI liner in these moderate-depth RBC restorations may be unnecessary, as the representative liner used did not improve hypersensitivity outcomes.

**Key Words.** Postoperative hypersensitivity; sensitivity; resin-modified glass ionomer liner; resin-based composite; restorative dentistry; posterior restorations.

*JADA 2013;144(8):886-897. ClinicalTrials.gov identifier NCT01268605.*



cians because pinpointing its underlying trigger or triggers and predicting its occurrence can be complicated by several technical and material factors. Moreover, persistent POH may require retreatment, which has oral health–related quality-of-life (QoL) and financial implications for the patient and, later, for the dental practice. The results of a recent PEARL study showed substantial POH in patients queried anonymously after receiving an RBC restoration.<sup>2</sup> At four weeks after restoration placement, approximately 18 percent of study teeth had appreciable hypersensitivity (AH) (as measured by the patient's indication of 3 or higher on a 0- to 10-point pain scale), and 10 percent of study teeth with no baseline hypersensitivity developed AH after restoration. In study teeth with AH at baseline, only about 63 percent experienced elimination of AH after restoration.<sup>2</sup> On further analysis, the study investigators found no relationship in AH outcomes between materials, including consideration of types of liners and bonding agents, and techniques used by the 45 dental practices involved.<sup>3</sup> On the basis of these findings, PEARL clinicians were eager to determine whether including an RMGI liner would reduce POH more than would use of a dentin bonding agent (DBA) alone in RBC restorations. If it did not, reductions in both RBC restoration chair time and cost would be possible.

In addition, PEARL Network P-Is believed the study could provide valuable information as to possible risk factors for POH, which included enamel caries stage, radiographic lesion depth, dentin caries activity (DCA) ranking, preparation depth and sleep bruxism (SB). We proposed that SB may contribute to the fatigue of the internal bond, leading to gaps between the restorative material and the dentin (particularly the pulpal floor); fluid filling these gaps results in occlusal loading sensitivity.<sup>4</sup> By identifying patients at risk of experiencing POH, clinicians might be able to take steps to manage these factors and reduce the incidence and severity of POH.

Published studies of patients who have experienced POH after receiving posterior RBC restorations have widely varying results, although most indicated some level of transient response among some proportion of patients. The majority of studies consisted of small samples and were associated with evaluating a particular bonding agent or RBC formulation, as we describe below.

**RMGI liners.** A significant number of PEARL Network dentists used RMGI or glass ionomer (GI) as a liner to reduce the possibil-

ity of POH.<sup>3,5</sup> Evidence as to the effectiveness of such a liner is mixed. Comparing the use of an RMGI liner with the direct application of a DBA, Akpata and Sadiq<sup>6</sup> found less patient-reported hypersensitivity seven days after treatment with the RMGI (22 percent) than with the DBA alone (47 percent). POH was reduced, respectively, to 10 percent and 26 percent among patients overall at 30 days. These results contrast with those of a combined Class I and Class II study of a packable RBC in which 4.8 percent ( $n = 12$ ) of restorations had been replaced within three years (10 within the first six months) as a result of POH on mastication.<sup>7</sup> According to the results of this study, 5 percent of Class I restorations failed as a result of this form of POH, and the majority of all failed restorations were those lined with GI. In addition to using RMGI, in a study examining the use of a calcium hydroxide ( $\text{Ca}(\text{OH})_2$ ) liner in deep areas of the preparation, Turkun and colleagues<sup>8</sup> found no instances of patient-reported hypersensitivity at six months, one year or three years after treatment in 16 Class I restorations (39 Class II restorations also were included). Investigators in studies involving dental patients who received posterior RBC restorations with or without an RMGI liner (no use of  $\text{Ca}(\text{OH})_2$ ) found no difference in these treatment groups.<sup>9,10</sup>

Sobral and colleagues<sup>11</sup> suggested that POH may occur regardless of the use of a liner or a DBA. In Class II restorations (three per patient, each with a different liner approach: DBA only or either an aldehyde-based desensitizer or chlorhexidine antibacterial treatment before placement of the DBA), the investigators found that all materials and techniques tested were associated with some degree of POH. The authors concluded, "Postoperative sensitivity resulting from Class II restorations using composite resin cannot be completely eliminated with the prior use of a dentinal desensitizer or a

---

**ABBREVIATION KEY.** **AH:** Appreciable hypersensitivity. **Ca(OH)<sub>2</sub>:** Calcium hydroxide. **CCS:** Caries Classification System. **DBA:** Dentin bonding agent. **DCA:** Dentin caries activity. **DEJ:** Dentinoenamel junction. **GI:** Glass ionomer. **HS:** Hypersensitivity. **IRB:** Institutional review board. **NPAS:** Numeric Pain Assessment Scale. **OHIP:** Oral Health Impact Profile. **PEARL:** Practitioners Engaged in Applied Research and Learning. **P-I:** Practitioner-investigator. **POH:** Postoperative hypersensitivity. **QoL:** Quality of life. **RBC:** Resin-based composite. **RMGI:** Resin-modified glass ionomer. **SB:** Sleep bruxism. **ZINB:** Zero-inflated negative binomial distribution. **ZIP:** Zero-inflated Poisson distribution.

Download English Version:

<https://daneshyari.com/en/article/3137635>

Download Persian Version:

<https://daneshyari.com/article/3137635>

[Daneshyari.com](https://daneshyari.com)