

# 2023 Restorative Review

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Temporary Cement: How These  
Materials Can Earn a Permanent  
Place in Your Inventory

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How Important Is a  
Material's Ease of Use?



# Temporary Cement: How These Materials Can Earn a Permanent Place in Your Inventory

*We explore what you should look for in these materials for the best and most predictable performance.*

BY TERRI LIVELY

**R**estorative dentistry demands a lot from temporary cement. It should provide excellent retention to a substrate for a provisional restoration and disappear quickly when it's time to place the final prosthetic. We explore what you should look for in these materials for the best and most predictable performance.

Research indicates that temporary cement has 3 primary uses. It bonds provisional prostheses, bonds definitive prostheses temporarily, or attaches a prosthesis to an implant. Moreover, the temporary cement should:<sup>1</sup>

- Provide sufficient prosthetic retention and a secure seal between the post and the restoration.
- Keep the seal intact despite changes in oral temperature
- Remain on the restoration rather than the tooth to make it easy to remove during debonding

Also, the dental tissues should tolerate the temporary cement well. It should also protect the prepared tooth and minimize sensitivity until the final restoration can be placed.<sup>2</sup>

## Classifying Temporary Cements

Usually, dentistry classifies temporary cement based on its composition. These typically break down into 4 main categories:<sup>3</sup>

- 1. Zinc Oxide with Eugenol Cements (ZOE):** ZOE cement contains eugenol that is effective at sedating the pulp and is antimicrobial. However, research emerged suggesting eugenol negatively influenced final cementation strength, which led to the development of zinc oxide temporary cement without eugenol.
- 2. Zinc Oxide without Eugenol Cements (ZONE):** ZONE cement is eugenol-free and offers excellent retention but has no sedating or desensitizing effect.
- 3. Polycarboxylate Cement:** Polycarboxylate cement adheres well to the tooth and offers excellent retention of provisionals but can be challenging to remove.
- 4. Resin-based Cement:** Resin-based cement offer excellent retention and better overall esthetics but can cause microleakage and sensitivity issues. Some newer resin cement has added potassium nitrate and chlorhexidine to help combat these issues.



BISCO's All-Bond Universal® Light-Cured Dental Adhesive, and TheraCal LC® Resin-Modified Calcium Silicate Pulp Protectant/Liner

However, their setting mechanism can also be used as a classification criterion. For example:<sup>1</sup>

- **Self-curing cement** consists of a base and a catalyzer. When mixed, it sets on its own. Calcium hydroxide or zinc oxide is used in its composition.
- **Dual-cure temporary cement** light activates and comprises translucent resins, making them an aesthetically appealing option.

### Choosing Between the Cements

Unfortunately, the answer to the question of which temporary cement is the one that should have a permanent place in your armamentarium is inconclusive. The consensus is that you should have a few options available for use in different situations. In other words, considering the properties of each type of cement material and the specific clinical situation when selecting the appropriate one for cementing a provisional restoration is essential to ensure the best outcome for the patient.

Factors such as the type of restoration, the tooth's location, and the tooth structure's condition are all considered when selecting a temporary cement. Spear Education encourages clinicians to consider the following 3 areas:<sup>3</sup>



#### AREA #1

##### Tooth preparation: What is the retention and resistance situation?

To ensure the provisional stays in place, clinicians must evaluate whether the tooth preparation provides enough resistance. For example, cement becomes crucial to retention if the preparation is short or tapered. By contrast, clinicians can use adhesive with minimal retentive properties if the tooth has a lengthy preparation or mechanical retention, like inlays or onlays. Splinting multiple teeth together also increases retention. However, minimal preparation for veneers in the anterior segment provides little to no retention.

#### AREA #2

##### Patient availability: How temporary will this provisional restoration be?

The duration of wear and patient availability are essential factors to consider when choosing suitable cement. If the patient cannot come in quickly or the treatment happens in phases, a durable adhesive is needed to keep the provisional in place and the preparation sealed. However, using retrievable cement works if the patient is returning soon. However, in cases involving dentin bonding, avoiding using a provisional that can harm the final cementation is essential.

#### AREA #3:

##### Visibility: Will anyone see where the provisional is going to be?

For the anterior teeth that are visible during a patient's smile, it's crucial to consider the provisional cement's opacity, especially for conservative restorations. Opaque provisional cement can show through the temporary and compromise the esthetics. Therefore, it's essential to choose a provisional cement that's transparent or tooth-colored, which would blend well with the provisional restoration and mimic the natural tooth color. This will ensure that the patient is satisfied with their appearance and provide a better idea of the final restoration.

Nathaniel Lawson, DMD, PhD, assistant professor, and director of the Division of Biomaterials at the University of Alabama Birmingham School of Dentistry, has a similar take. He thinks temporary cement falls into 2 major types: ZONE and resin-based temporary adhesives.

Generally, Dr Lawson explains, ZONE cement is cheaper but less esthetic (white opaque) and less retentive. On the other hand, Dr Lawson says resin cement is more esthetic because it can be transparent or tooth-colored.

“Sometimes a ZONE cement will be visually apparent through a thin temporary or at the margin,” Dr Lawson says.

While the idea that cement might not retain a temporary as well as another sounds like a nonstarter for the non-retentive cement, Dr Lawson explains that it depends on the situation. So, have both options available depending on the circumstances and the prep.

“Sometimes less retention is good as you don't want to struggle to get a temporary cement off, but other times more retention is good because you don't want your temps falling off,” Dr Lawson says. “It depends on how retentive the prep is.”

### Some Other Considerations When Choosing Temporary Cement

In a study published in the *Journal of Clinical and Experimental Dentistry*, researchers found that thermocycling significantly affected the retention values of temporary cement (except for Temp-Bond™ Clear, KaVo Kerr). Also, the researchers found that dual-cure cement showed higher retention values after thermocycling, making them suitable for cases with short or convergent tooth stumps where restoration retention could be compromised. This finding is consistent with previous research that included thermocycling.<sup>1</sup>

Also, the researchers recommended dual-cure cement for anterior teeth when definitive restoration involves partial or complete coverage due to their translucency and retention capacity. By contrast, self-curing cement is suitable for the posterior sector and anterior sector restoration with metal-ceramic restorations where cement with eugenol can be used as adhesive cementation of the definitive prosthesis is not required.<sup>1</sup>

Also, where the cement ends after debonding the provisional might be an essential part of a clinician's decision process; researchers found more cement remaining on the restoration when dual-cure cement



BISCO's Duo-Link Universal® Resin Luting Cement

was used, ironically often preferred for easy extraoral cleaning. By contrast, self-curing cement tended to stay on the teeth.<sup>1</sup>

However, clinicians should avoid dual-cure cement when planning to use the immediate dentin sealing technique. There are indications that the resin could potentially bond with the temporary cement.<sup>1</sup>

The main goal of temporary cementation is to provide sufficient prosthesis retention and sealing while ensuring clinicians can easily remove cement when it's time. So, when deciding which temporary cements to choose as a permanent resident of your inventory, be sure you have different options for specific cases that can adapt to the unique needs of your restorative case.

### References

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# How Important Is a Material's Ease of Use?

## Can a material's usability earn dentists more business?

BY TERRI LIVELY

**P**roduct development in materials has many goals, including the overarching goal of developing the material of choice for every clinician using it. When it comes to earning business for dentists, how important is the material's ease of use?

Rolando Nunez, DDS, MSc, manager of clinical research at BISCO, Inc, believes it is essential for a product to be easy to use. Moreover, a product's user interface should not differ significantly from what individuals are doing now or require a lot of specific equipment, which can be a turnoff for clinical teams. If a material requires any of those things, its performance must be worthwhile to manage the aggravation resulting from adjustments in the dental practice

For example, when dentistry introduced intraoral scanners, the scanners presented an enormous opportunity for dental practices to incorporate digital dentistry. Dr Nunez says dental practices thought digital scanners were worth the disruption, expense, and training required to incorporate them into the practice.

Few materials deliver game-changing results the way intraoral scanners did. Therefore, Dr Nunez thinks most restorative materials tend to be plug and play, meaning they are approximately the same user interface with neither significant nuance nor steep learning curve.

***"For instance, one cement will be very similar to another when it comes to how to use and dispense it. It might have nuances like viscosity and shade but nothing that will be a deal breaker," Dr Nunez says.***

Jason Goodchild, DMD, vice president of clinical affairs for Premier Dental Products Company, agrees that ease of use is essential but not at the expense of optimal



results. Premier is always thinking about how to make something better, safer, faster, less expensive, and easier to use to achieve a desired outcome.

However, clinicians should consider the disruption to the regular workflow as well, Dr Goodchild says. For example, if a product changes how a dental team works, the launch will require a lot of marketing and client education, which may or may not work. Therefore, staying within the confines of the existing workflow is often one of the features required for ease of use. As a result, many products grow incrementally rather than by making giant leaps. "When you do that, the constraints of product development become difficult," Dr Goodchild says.

Regarding the benefits of a new product, Dr Goodchild says Premier's voice of the customer exercises reveal clients need the material to be efficient from a price standpoint and the confidence that it will do what the company claims. However, ease of use also tops the list of what clients want. "For the [individuals] who are using it, they've got to be able to put it in their hand and know exactly what to do," Dr Goodchild says.

The need for efficiency in the dental office drives this mentality. However, because every clinician already has their own way of doing things, disruptions to that method can be a tough sell for many dental practices, “especially when the existing system was working just fine,” Dr Goodchild says.

For example, Premier’s Traxodent® Hemodent® Paste Retraction System tops the product category of tissue management. It’s easy to use and works well. However, Dr Goodchild says the team is hesitant to research improvements to the product for fear of inadvertently changing something that was working well. “We are mindful of how to improve an already successful product without screwing it up,” Dr Goodchild says.

### Why We Like Things to Be Easy

The behavioral sciences, which study how psychology affects individuals’ decision-making, assert that our need for things to be easy comes from our ancestors. In the past, conserving energy was connected to survival. Saving our strength was essential when competing against others and hunting for and gathering food.<sup>1</sup>

We don’t have the same living conditions as our ancestors, but we still have their minds. Even when food is abundant and refueling requires far less effort, our brain still favors expending less energy when given a choice. Therefore, we are hardwired to appreciate things that are easy.<sup>1</sup>



BISCO's TheraCem® Self-Adhesive Resin Cement

### What Makes Something Easy to Use?

From a dental practice perspective, Troy Schmedding, DDS, AAACD, says adhesive dentistry contributes to why dentists want things to be easy. When the primary restorative material was amalgam, the technique wasn't as crucial to obtain an excellent outcome. However, when adhesive dentistry became the restorative approach of choice, the technique developed many more steps. Unfortunately, with each step, there is an additional opportunity for a mistake that affects the patient outcome.

“As a clinician, a product’s ease of use is critical because of the communication factor that goes into a lot of adhesive-based dentistry, meaning you’re relying on an assistant or someone to help you apply these materials. So having fewer steps means fewer opportunities for something to get messed up,” Dr Schmedding says.

Dr Schmedding likes PANAVIA™ SA Cement Universal because it contains 10-methacryloyloxydecyl dihydrogen phosphate and a silane-based monomer, which he describes as a game changer in self-adhesive resin cement products. He appreciates that he still has the option to use it with a bonding agent. He finds it is a material he uses a lot in his practice. “That would be my Swiss Army knife in terms of cement,” Dr Schmedding says.

However, ease of use has many definitions, Dr Nunez says. For example, composites have different elements that make them easy to use. So although one clinician might equate ease of use with convenience, another might think ease of use refers to a multipurpose material. Others might call a material easy to use because it has a simple user interface.

***“When you talk about a composite, ‘easy to use’ might be related to handling, matching a shade, or the ability to polish, which are related to the user interface, not clinical performance. But those things are crucial because you want the learning curve for the material to be quick,” Dr Nunez says. “You want to be able to use things fairly quickly and hassle-free.”***

One characteristic Dr Goodchild thinks makes products easy to use is robustness. This term describes a product one may use in different environments, including less than ideal conditions, that still works. Clinicians consider that easy, he says.

Dr Goodchild also says products should fit client expectations of the product category, meaning ease of use is product specific. For example, an easy-to-use cement might be easy to apply and clean up. In contrast, an easy-to-use bonding agent will not produce postoperative sensitivity but will be easy to spread around and have a suitable viscosity.

Also, Dr Goodchild thinks ease of use should include a 360° view of a product. For example, how does it interact with other products? How does it interact with the dental team? How well does it perform for the patient? He sees these questions as part of the idea of what makes things easy.

***“I don’t think you can separate ease of use from clinical success,” Dr Goodchild says. “I can make things that are easy to use, but if they don’t work, they are not worth it.”***

Dr Schmedding also thinks reducing the number of steps is essential for easy-to-use products. For adhesive dentistry, he thinks clear directions and 2-bottle bonding agent systems that help with “minimizing the chemistry set” are essential. Even though it cuts out a few steps, using single-bottle bonding agents increases the dynamic for potential issues, Dr Schmedding says.

For example, drying times or application times are different depending on the substrate, which can complicate things for the dentist. In addition, paying extra attention to details like shaking the bottle, making sure the adhesive is agitated when applying it, and adequately air-thinning to allow time for the solvents to evaporate and achieve good bond strength doesn’t make things easy.

“The simplification of adhesion-based dentistry usually means we’re combining things into 1 bottle, which is very convenient for us,” Dr Schmedding explains. “But within that 1-bottle system is a lot of chemistry and a lot of opportunity

for error if not used properly. It’s counterintuitive. Two bottles with 2 steps might be a little more complicated, but it’s easier because you separate chemistry.”

### What You Might Sacrifice for Ease of Use

There are almost always trade-offs when you increase the convenience of something. For example, Dr Nunez’s watch delivers his text messages, but the text is too small for him to read. So he would rather read them on his phone.

Similar trade-offs exist when increasing the convenience of dental materials that clinicians use for many indications, Dr Nunez says. Although research supports the use of dental materials for many indications, he says it also shows that multipurpose systems are not always the optimal options.

There are other sacrifices that a clinician makes for ease of use. For example, most cement comes in an automix syringe, which is easy to use and convenient because clinicians don’t need to mix the cement by hand. Dr Nunez says the drawback here is not performance but waste. “So, it all depends,” Dr Nunez says. “Ease of use has its drawbacks.”

Clinicians should also remember that when something changes about a product, it will likely affect something else. Dr Goodchild says it’s never a zero-sum game. For example, if manufacturers change the viscosity of a composite to make it flow into tight preps, it might be harder to control.

However, the best products find a way to answer the clinician’s pain points while working well and remaining cost-efficient for the dental practice’s margins. “If you look at market-leading products across the board, you could make the case they all check that box: They all are easy to use. Plus, they’re all well-established brands and very good at what they do,” Dr Goodchild says. “When you get all those things, you’ve got a home run.”

### Reference

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