BioCem Universal BioActive Cement

Designed specifically for pediatric dentistry

Glass ionomer cements are well known for their high fluoride release and their ability to bond to dentin — even when there is a high level of contamination due to excessive blood and saliva. They’ve been proven for years to be a great choice for cementing stainless steel crowns for primary dentition. So wouldn’t glass ionomer cement be the perfect choice for any preformed zirconia or pre-veneered stainless steel crown? Not necessarily. All full coverage esthetic crowns, whether preformed zirconia or pre-veneered stainless steel crowns, are designed for a passive fit. While NuSmile® ZR Zirconia and NuSmile® Signature crowns have better marginal integrity than other esthetic crown brands, all preformed esthetic crowns, regardless of the manufacturer, will have at least some areas exhibiting a more open margin than a traditional “snap fit” stainless steel crown.

So why does this matter when choosing a cement? Traditional glass ionomer cements have high water solubility compared to most resin modified glass ionomer (RMGI) cements. When using a glass ionomer cement with any esthetic preformed crown, the restoration is susceptible to cement washout at the margins. Over time, this provides the opportunity for secondary decay at the margins and weakening of bond strength between the cement, tooth and crown. These risks increase the longer the restoration is in the mouth.

This is one reason why NuSmile invented BioCem Universal BioActive Cement, the first and only RMGI cement specifically designed for pediatric dentistry. High washout resistance and minimal susceptibility to microleakage, coupled with unique handling and cure properties, make NuSmile BioCem a great alternative to traditional glass ionomer cements in most conditions. Additionally, its unique bioactive properties have been shown in independent university-led research studies to release fluoride, calcium and phosphate to trigger hydroxyapatite formation. These properties, together with its BPA/BisGMA/HEMA-free formulation, make BioCem the new industry standard defining a new class of RMGI cements. NuSmile BioCem requires a reasonably dry field with minimal excess moisture and no pooled blood or saliva during cementation. In cases where these conditions cannot be achieved, a glass ionomer cement may be a better alternative to ensure a strong initial bond between the cement and the tooth.

NuSmile is committed to evidence-based, research-led dentistry. Our best customer is an informed customer, and we are proud to offer you new choices to add to your armamentarium so that you can make informed decisions to provide the best possible care for your pediatric patients.

Read further to understand in more detail how BioCem compares to glass ionomer and other RMGI cements, and how BioCem can be a powerful addition to your practice.
NuSmile BioCem® Universal BioActive Cement is the **only** luting cement that delivers:

**Superior Bond Strength**
BioCem’s bond to all zirconia, pre-veneered and stainless steel crowns is as strong or stronger than RMGI cements, and stronger than glass ionomer cements.

**Exceptional Handling, Working/Setting Time and Clean-Up**
BioCem receives outstanding user ratings for ease of handling, working and setting (curing) time, and ease of clean-up, making BioCem a Dental Product Shopper’s “Best Product” with the highest overall rating ever received for a bioactive cement.

**Versatile Dual Cure - Flash Cure/Self Set Technology**
BioCem delivers quick, easy and reliable cure and setting times for every type of preformed pediatric crown.

**Unmatched Evidence of Hydroxyapatite Formation and Beneficial Ionic Release**
Independent research indicates BioCem forms or triggers the formation of hydroxyapatite at the cement-tooth interface that is available to integrate with and replenish tooth structure.
BioCem releases unmatched levels of phosphate, calcium and fluoride to maintain a healthy oral environment.

**Naturally Balanced pH**
With a chemical and structural composition similar to dentin, BioCem provides a neutral pH profile that is compatible with the oral environment.

**Hydrophilic, Yet Low Water Sorption and Solubility**
BioCem’s unique hydrophilic composition exhibits extremely low water sorption and solubility, providing a biocompatible marginal seal that prevents cement washout with preformed zirconia and pre-veneered crowns, and does not depend on perfect isolation during cementation.

**Minimal Microleakage for a Tightly Integrated Seal**
BioCem exhibits far less microleakage than traditional glass ionomer cements (e.g., Ketac™ Cem) when tested with the most popular brands of zirconia crowns, making it the perfect cement for any pediatric crown…PERIOD!
Superior Bond Strength

BioCem’s bond strength to both zirconia and stainless steel is significantly higher than the leading glass ionomer cement (Ketac™ Cem). BioCem’s bond strength to zirconia is also significantly higher than RelyX™ Luting Plus and statistically equivalent to FujiCEM™ 2.

Source: Shelter and Webb, Medical University of South Carolina, 2014
Exceptional Handling, Working/Setting Time and Cleanup

Following four weeks of use in their practices, 14 dentists evaluated NuSmile BioCem, resulting in a DENTAL PRODUCT SHOPPER “Best Product” designation and an exceptional overall rating of 4.6 (on a scale of 5.0) (Ceramir® received a 4.3 rating in a similar study conducted by the same organization.)

BioCem’s individual ratings included:
- Ease of handling: 4.6
- Working and setting (curing) time: 4.4
- Ease of cleanup: 4.7

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>AVERAGE SCORE (out of 5)</th>
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<tbody>
<tr>
<td>Ease of handling</td>
<td>4.6</td>
</tr>
<tr>
<td>Working and setting (curing)</td>
<td>4.4</td>
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<tr>
<td>Initial bond strength</td>
<td>4.1</td>
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<tr>
<td>Ease of clean-up</td>
<td>4.7</td>
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<tr>
<td>Lack of sensitivity</td>
<td>4.8</td>
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<td>SECTION A AVERAGE</td>
<td>4.6</td>
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<tr>
<td>OVERALL SATISFACTION</td>
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BioCem’s higher viscosity, perfect for filling and positioning preformed pediatric crowns, is one reason for its superior rating. Yet even with its high viscosity, its film thickness is as low as, or lower than, the other most popular cements used in pediatric dentistry.

<table>
<thead>
<tr>
<th>Film Thickness (microns)</th>
<th>RelyX™ Luting Plus</th>
<th>Ketac™ Cem</th>
<th>FujiCEM™ 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>BioCem®</td>
<td>11</td>
<td>17.0 ± 2.6</td>
<td>16 ± 1</td>
</tr>
</tbody>
</table>

This combination of high viscosity coupled with low film thickness makes BioCem extremely easy to use with all preformed pediatric crowns.
Versatile Dual Cure - Flash Cure/Self Set Technology

BioCem’s unique dual cure - flash cure/self-set technology gives you exceptional control. After placement, you can flash cure BioCem to a rubbery consistency, making it a snap to remove excess cement from the margins. You can then allow the cement to continue to self-set for SSC or pre-veneered crowns, or you can finalize the cement set with a standard curing light for zirconia crowns. No more holding and waiting for cement to set with preformed zirconia crowns!

The ability to flash cure and to quickly achieve final cure provides clinicians a huge advantage when placing zirconia crowns, ensuring that the crown stays properly positioned and saving valuable operating time.
Unmatched Evidence of Hydroxyapatite Formation

BioCem provides important remineralization contributors, including phosphate and calcium that interact with dentin to form a natural seal at the tooth-cement interface within 24 hours.

In in-vitro testing, both BioCem and Ceramir® form “tags” between cement and dentin, where RelyX™ Luting Plus does not. These tags provide integration between the two surfaces, and have a chemical analysis and Ca/P ratio consistent with hydroxyapatite. BioCem tags form within 24 hours, while Ceramir® tags take seven days to form.

<table>
<thead>
<tr>
<th>&quot;Tag&quot; Analysis</th>
<th>Cement Analysis</th>
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<tbody>
<tr>
<td><strong>PROS</strong></td>
<td><strong>CONS</strong></td>
</tr>
<tr>
<td>Ca/P ratio about 1.5 to 1.6</td>
<td>No tag formation</td>
</tr>
<tr>
<td>Dual curing automix</td>
<td>Ca/P ratio not increasing over time for dentin or material composition</td>
</tr>
</tbody>
</table>

**RelyX**
- Ca/P ratio above 1.7 after seven days in tags
- Ratio of Ca/P still increasing after twenty-one days

**Ceramir**
- Immediate tag formation
- Ca/P ratio above 2.8 at 24 hours in tags

**BioCem**
- Immediate tag formation
- Ca/P ratio decrease slightly in tags over study but remained above 1.7

**PROS**
- Ca/P ratio above 1.7 after seven days in tags
- Ratio of Ca/P still increasing after twenty-one days

**CONS**
- No immediate tag formation
- Not dual curing
- Difficult to work with

Naturally Balanced pH with Beneficial Ion Release

Comparing BioCem to the only other cement in its category (Ceramir), BioCem demonstrates a significantly higher level of sustained calcium and fluoride release. BioCem provides these important reminerization contributors while also maintaining a naturally balanced pH in the oral environment.

Hydrophilic, Yet with Low Water Sorption and Solubility

NuSmile BioCem exhibits very low water sorption compared to other popular glass ionomer and RMGI cements used in pediatric dentistry. BioCem’s water solubility is less than half of that of Ketac™ Cem and FujiCEM™ 2.

Pediatric zirconia or pre-veneered stainless steel crowns, by design, have more open margins and are more susceptible to cement washout over time than “snap-fit” stainless steel crowns. The ability of the cement to “stay put” for the life of the primary tooth until exfoliation is important to ensure retention and also to minimize the possibility of recurrent decay at the margins or under the crown.

**Low Microleakage for a Tightly Integrated Seal**

When comparing two luting cements (NuSmile BioCem and Ketac™ Cem) used with two types of pediatric zirconia crowns (NuSmile ZR and EZPEDO®) cemented to extracted teeth.

- NuSmile BioCem exhibits less microleakage regardless of the brand of zirconia crown used.

- Teeth restored with NuSmile ZR Crowns and cemented with NuSmile BioCem exhibit the lowest microleakage of any combination tested and provide the only results statistically different from the other combinations tested.

The authors’ conclusion: “Microleakage occurs in prefabricated zirconia crowns due to limited seal and inadequate fit of the crown. Loss of cement can lead to early loss of full coverage restorations. This study concluded that a better seal occurs with BioCem cement and zirconia prefabricated crowns. The best seal occurred with BioCem and NuSmile ZR crowns.”

*Microleakage measured utilizing stereomicroscopy on a 4-point scale

The perfect cement for any pediatric crown.