Technical Guide

Instructions for Use and General Information / Preformed Crowns
Stainless Steel, Pre-veneered SSC and Zirconia

- **Special Instructions**
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- **Physical Properties**
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NuSmile BioCem®

Stainless Steel, Preveneered SSC and Zirconia Crowns

Intended Use: NuSmile® BioCem® Universal BioActive Cement is a high performance cement ideal for use in pediatric dentistry. It provides a superior bond between dentin and all stainless steel, pre-veneered or zirconia crowns. BioCem is a "CemBiotic™" hydrophilic yet water insoluble material, that actively participates in the oral environment, and is available to replenish the physical and chemical properties of the natural tooth and surrounding structures. Additionally BioCem promotes the formation of hydroxyapatite that is available to integrate with and strengthen existing tooth structure.

BioCem is a two-paste system housed in an easy to store and use double-barreled syringe. The cement is delivered through an efficient low waste auto-mix tip. BioCem cures through two self-curing mechanisms, additionally accelerated by light cure. The material contains no HEMA, Bis-phenol A, Bis-GMA or BPA derivatives.

• Special Instructions

- BioCem begins to self-cure immediately upon mixing/dispensing. Total working time is approximately 60 seconds. Self-cure time is typically three (3) minutes in oral environments. Curing is accelerated using a curing light.
- BioCem should not be mixed by hand. Mixing by hand can create air pockets and uneven mixing and cure. Only use NuSmile BioCem auto-mix tips when cementing with NuSmile BioCem cement.

• Instructions for Crown Cementation

Important Preparation Notes

- Prepare crown to be cemented in the usual manner.
- When using a eugenol based material, seal the exposed eugenol medicament with a resin-free glass ionomer (GI).
- If cementing to amalgam composite or GI, clean, mechanically roughen and rinse. Make sure these surfaces are completely dry.
- Hemostatic agents and disinfectants may inhibit cement retention to dentin and enamel. If using these agents, thoroughly water-rinse the tooth before cementing the crown.
- When the preparation leaves little tooth structure remaining, or when remaining tooth is overly tapered (>15°), if possible add under cuts in the dentin to provide mechanical retention between the remaining dentin and the cement.
- Dry the tooth with compressed air and/or a cotton pellet. There should be no visible water, saliva, or blood on the tooth or at the gum line/gingiva. Wet surfaces will result in decreased bond strength. Do NOT desiccate the tooth.
- When cementing zirconia crowns, if the crown is contaminated with saliva or blood, it must be decontaminated. When using NuSmile ZR zirconia crowns use NuSmile pink Try-In crowns for trial fitting to avoid contamination and skip step i below.

i. After trial fitting, all zirconia restorations must be decontaminated prior to cementation. Either blast the inside of the restoration with aluminum oxide (Al_2O_3) or clean the inside of the restoration with Ivoclean: http://www.ivoclarvivadent.com.

ii. DO NOT use a primer/bonding agent on the zirconia surface.

- Simultaneously cement only as many preformed crowns to not exceed 60 seconds working time.

Step-by-Step Instructions

1. Remove syringe cap from the BioCem syringe by twisting the cap and then pulling. DO NOT THROW THE CAP AWAY. If necessary bleed the syringe so that both the cement components are at the opening of the syringe barrels. Place auto-mix tip on the syringe aligning the V-shaped notch on the syringe tip with the corresponding notch on the syringe. Twist to lock into place.
2. Immediately dispense the cement through the auto-mix tip directly into the crown, filling the crown from the bottom up as normal.
3. Immediately after filling the crown with cement, place the crown over the tooth and properly position/seat the crown. The crown should be seated and adjusted to its final position within 60 seconds of filling the crown with cement.

Continued on reverse side

NuSmile®

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- **Instructions for Crown Cementation** *Continued from reverse side*

  4. While securing the crown using gentle finger pressure
     - Stabilize the crown for 20 seconds to allow the cement to react with the tooth.
     - Using a curing light, flash cure for 3-5 seconds each on both the facial and lingual margins if using a 1200-2000 mW/cm2 curing light, or up 5-10 seconds each on both margins if using a 800-1200 mW/cm^2 curing light. Do not light cure for more than 20 seconds total as any excess cement will be difficult to remove. **MINIMIZE ANY MOVEMENT OF THE CROWN AFTER EXPOSURE TO CURING LIGHT**
     - Gently remove any remaining excess cement with a suitable instrument. Clear contacts and interproximal areas with floss, taking care to avoid **ANY** movement of the crown. All excess cement should be completely cleaned away during this stage or it may bond to the exterior of the crown and adjacent teeth.
  5. For zirconia crowns, light cure for an additional 10 seconds (1200-2000 mW/cm^2 light) or 20 seconds (800-1200 mW/cm^2 light) each on both the facial and lingual surfaces.
     For stainless steel and pre-veneered SSC crowns keep crown stable for a total of 4 minutes from time the crown is seated to ensure proper bonding.
  6. Remove mixing tip and re-cap with original cap immediately after use. Discard each tip after use. Tips are not reusable.

- **Physical Properties**

Light cure setting time	20-40 seconds (based on cement depth)
Depth of light cure	4mm
Typical working time (under operatory light)	60 seconds
Typical self-cure time at 37°C	3 minutes
Polymerization shrinkage	negligible
Water sorption after 1 week (in vitro)	2.7%
Water solubility after on (1) week (in vitro)	0.5%
Fluoride release @ 1 day: (in vitro)	360ppm
Cumulative fluoride release @ 28 days (in vitro)	1,300ppm
Flexural Strength	88.4 MPa / 12,800 PSI
Flexural Modulus	3.7 GPa
Compressive Strength	210 MPa / 30,500 PSI
Diametral Tensile Strength	37 MPa / 5365 PSI
Film thickness	11 microns
Radiopaque	

- **Additional Cautions, Storage and Maintenance**

  Refrigeration of BioCem is recommended to ensure shelf-life. Degradation, indicated by extended self-set time, will occur if BioCem is exposed to elevated temperatures for a prolonged period. NuSmile BioCem should be stored in a cool, dry environment (5-13°C /40-55°F) Avoid direct light, extremes of temperature, high humidity, contamination and sources of ignition. Shelf life of unopened product: Two (2) years from date of manufacture.

Rx Only

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NuSmile BioCem™

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