## Dentistry

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October 2019

### A USER'S GUIDE TO BIOACTIVE CEMENTATION

By Les Rykiss, DMD

#### As clinicians, we like to find a cement that not only works, but also works well with all of our material choices. ACTIVA BioACTIVE-CEMENT meets both criteria. It is compatible with zirconia, e.max, and lithium silicates, as well as traditional indirect restoration materials, such as metal and PFM crowns and bridges. The material is dual-cure and easy to use and clean up.

**ACTIVA BioACTIVE-CEMENT** mimics the physical and chemical properties of teeth. It contains a bioactive ionic resin matrix, a patented shock-absorbing rubberized resin component, and reactive ionomer glass fillers. The material is insoluble, and the shock-absorbing component, measured by deflection at break, makes ACTIVA tougher and more resistant to fracture than traditional resin cements, glass ionomers, and RMGIs.\* The ionic exchange that takes place between saliva, ACTIVA, and the tooth results in extremely low microleakage with a constant recharging of the ions that supports remineralization and protects crown margins.

ACTIVA BIOACTIVE-CEMENT reacts to the continuous pH changes of the oral cavity, releasing and recharging calcium, fluoride, and phosphate ions. This helps to fortify and recharge the ionic properties of saliva, teeth, and the cement itself to create an unparalleled restorative team.

\*Compressive strength and deflection at break of four cements. Daddona J, Pagni S, Kugel G. J Dent Res. 95(Spec Iss A): 0658, 2016 (www.iadr.org).

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BioACTIVE

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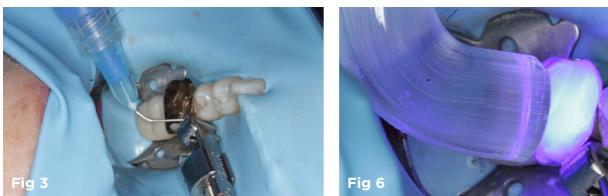






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### BIOACTIVE CORE BUILD-UP & CEMENTATION

In the following case, a failed amalgam restoration with a fractured cusp is restored using ACTIVA BioACTIVE-RESTORATIVE and ACTIVA BioACTIVE-CEMENT. The entire procedure was accomplished in a few hours using Dentsply Sirona's CEREC<sup>®</sup> system to capture, design, mill, and glaze a crown made with Dentsply Sirona's Celtra<sup>®</sup> Duo (zirconia-reinforced lithium silicate).

Fig 1 Preoperative image of tooth No. 19 with fractured mesial buccal cusp. Fig 2 Snoop Caries Detecting dye was used, rinsed, and followed by placement of a Tofflemire band. Fig 3 Total etch technique using Etch-Rite 38% Phosphoric Acid (Pulpdent) was used for 15 seconds, then rinsed, followed by lightly air drying leaving the surface slightly moist. Fig 4 Moist bonding technique with One-Step® Plus (BISCO) consisting of three 5-second applications of bonding agent, followed by air drying and light curing for 10 seconds. Fig 5 An incremental filling technique was used with ACTIVA BioACTIVE-RESTORATIVE (Pulpdent). Fig 6 The ACTIVA BioACTIVE-RESTORATIVE core build-up was cured for 20 seconds prior to band removal and then for 20 additional seconds after band removal from both the buccal and lingual sides. Fig 7 After trimming and contouring, the completed core build-up is ready for crown preparation.

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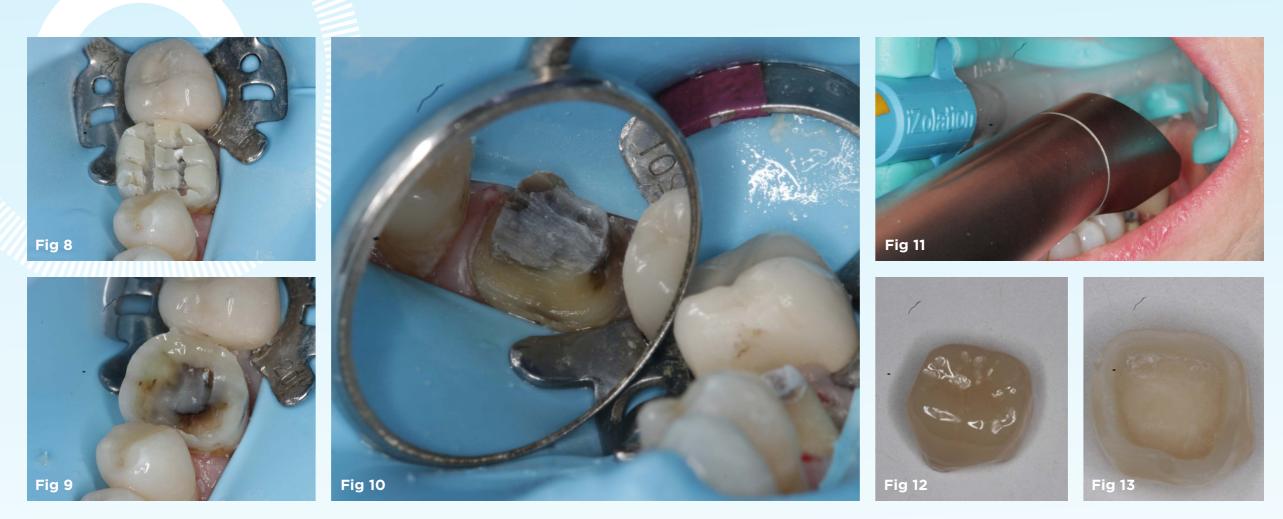


Fig 8 2-mm depth grooves cut to ensure adequate occlusal reduction for Celtra Duo (zirconia-reinforced lithium silicate) CAD/CAM restoration. Fig 9 Shows completed even occlusal reduction while preserving tooth height. Fig 10 Final preparation with 2-mm occlusal reduction, 1.5-mm axial wall reduction, and 1-mm chamfer margin for Celtra Duo zirconia-reinforced lithium disilicate restoration. Fig 11 Digital scan using CEREC Omnicam (Dentsply Sirona). Fig 12 Fully finished, polished, and glazed Celtra Duo zirconia-reinforced lithium silicate restoration. Fig 13 Crown cleaned with Ivoclean (Ivoclar Vivadent), dried, then etched with 9.5% buffered hydrofluoric acid gel etchant (BISCO), dried again, and then silanated with a two bottle mixed silane (Bis-Silane<sup>™</sup> part A and B, BISCO).

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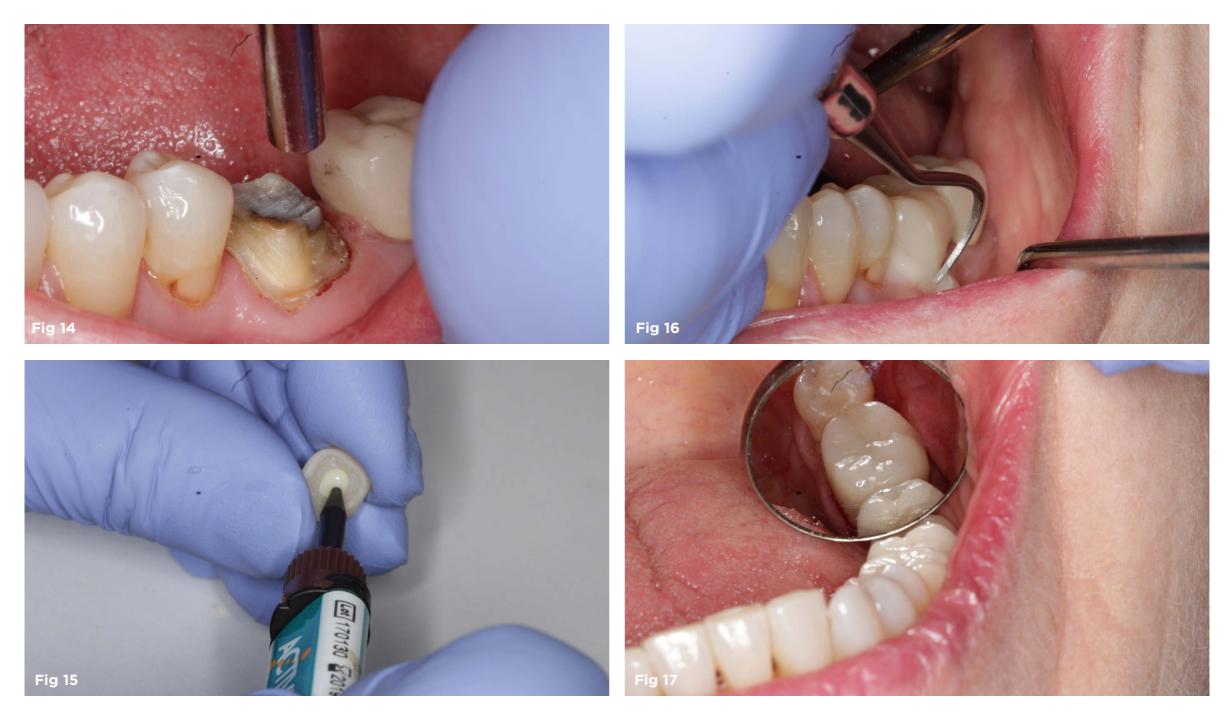


Fig 14 Tooth No. 19 etched with Etch-Rite for 15 seconds, lightly air dried (to avoid desiccation), and bonded with three 5-second applications of One-Step Plus bonding agent, followed by air drying and light curing for 10 seconds. Fig 15 Crown loaded with ACTIVA BioACTIVE-CEMENT (Pulpdent). Fig 16 The restoration was tack cured for 2 seconds each on the buccal, lingual, and occlusal surfaces. Excess cement at the margins could then easily be removed. A knotted piece of floss was used to remove excess cement interproximally before light curing all exposed surfaces for 20 seconds. Fig 17 Final restoration.



### ZIRCONIA RESTORATIONS

**Zirconia restorations** are treated somewhat differently to achieve the same long-lasting results. First, the roughened zirconia surface is cleaned with Ivoclean to remove any surface debris before treating with a zirconia primer such as Z-Prime<sup>™</sup> Plus (BISCO). Then the surface will bond with ease when treated with a bonding agent, and cementing with ACTIVA BioACTIVE-CEMENT will be seamless.

Fig 18 Zirconia cantilever bridge for teeth Nos. 29 and 30. Fig 19 Zirconia milled custom abutment in situ. Fig 20 Z-Prime is applied to internal crown surface and to zirconia abutment surface for 20 seconds and then air dried. Fig 21 One-Step Plus application to abutment and to internal aspect zirconia bridge, three 5-second applications, then air dried and light cured for 10 seconds each. Fig 22 ACTIVA BioACTIVE-CEMENT is loaded into crown, then seated on abutment and tack cured from buccal, lingual, and occlusal sides for 2 seconds each. Fig 23 The cement cleans up easily with a scaler or even an explorer. Fig 24 The buccal, lingual, and occlusal sides of the zirconia cantilever bridge for teeth Nos. 29 and 30 are cured for 20 seconds per side. Fig 25 Final restoration.

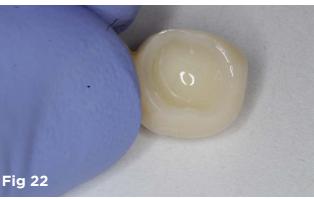
#### ACTIVA BIOACTIVE-CEMENT

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was chosen for this case because of its reliability, ease of cleanup, and bioactive properties, which will help protect against microleakage.

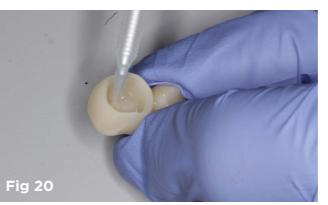
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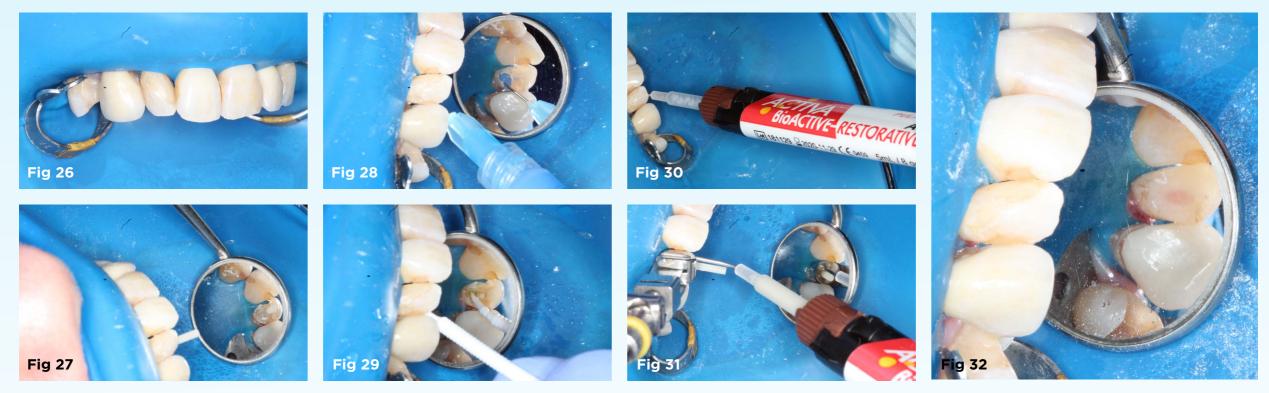






### **BIOACTIVE CEMENTATION** OF ENDODONTICALLY TREATED TOOTH

In this case, an endondontically treated tooth No. 7 receives a fiber post and core using **ACTIVA BioACTIVE-RESTORATIVE**, then the final e.max layered crown is cemented with ACTIVA BioACTIVE-CEMENT. While ACTIVA Cement also could have been used to secure the fiber post, using ACTIVA BioACTIVE-RESTORATIVE as a core build-up material helped simplify the procedure.



**Fig 26** Endodontically treated tooth No. 7 is isolated with rubber dam. **Fig 27** The post space was prepared for a SuperPost (Dental Savings Club) and all other restorations were removed for the fiber post try-in. **Fig 28** The tooth and canal were rinsed thoroughly, and the canal was dried with paper points. The canal and coronal restoration areas were etched with Etch-Rite 38% phosphoric acid gel for 15 seconds, then thoroughly rinsed and dried, leaving the coronal area slightly moist. The canal was blot dried with paper points, ensuring that it was still moist. **Fig 29** The canal, coronal restoration area, and post were each treated with One-Step Plus bonding agent with three 5-second applications. The canal was blot dried with paper points until no bonding agent returned from canal on points, then coronal area was dried and light cured. The post was light cured for 10 seconds as well. **Fig 30** The canal is filled with ACTIVA BioACTIVE-RESTORATIVE, and the post is inserted completely, then light cured for 20 seconds. **Fig 31** After placing a Tofflemire band, more ACTIVA BioACTIVE-RESTORATIVE material is used to fill remaining core area and then cured for 20 seconds. **Fig 32** The Tofflemire band was removed, the post shortened, and core restoration was trimmed and polished. The crown preparation was made for an e.max (Ivoclar Vivadent) laboratory fabricated crown with stacked porcelain (image not shown).

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Fig 36

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Fig 37

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Fig 33 Upon return from the laboratory, the crown was etched with 9.5% Buffered Hydrofluoric acid (Porcelain Etchant, BISCO) for 20 seconds, then thoroughly rinsed and dried. The 2-part Bis-Silane was mixed, and the crown was treated for 20 seconds, then air dried. Fig 34 The adjacent teeth were covered with Teflon plumber's tape, and the isolated tooth No. 7 was etched for 15 seconds with Etch-Rite 38% Phosphoric acid, then thoroughly rinsed, and lightly air dried to leave surface moist. Fig 35 The moist preparation was then treated with three 5-second applications of One-Step Plus bonding agent, followed by air drying and light curing for 10 seconds. Fig 36 Crown is loaded with ACTIVA BioACTIVE-CEMENT, seated, and held in place for a few seconds. Fig 37 The crown is tack cured for 2 seconds each from the labial and palatal sides. Fig 38 The cement is tack cured for 2 seconds, and excess is easily removed with a scaler. Fig 39 The Teflon tape is removed, the interproximal cement removed with knotted floss, and the labial and palatal aspects are cured for 20 seconds each. The material also self cures. Fig 40 Final cemented crown in situ.

### **ABOUT THE AUTHOR**

**DR. LES RYKISS** obtained his DMD from the University of Manitoba in 1990. He has his private practice in Winnipeg, MB. He has attained dip. ABAD status, Fellowship Degrees in FIADFE, FASDA, and an Associate Fellowship in Lasers from the WCLI. He's a graduate and Mentor at the Nash Institute for Dental Learning. His dental memberships include the MDA, CDA, ASDA, IADFE, and he is the Cosmetic Editor for *Oral Health Journal.* 



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- Perfect for all substrates
- Shock absorbent like dentin
- Resists wash out

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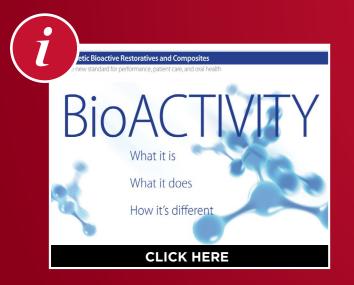


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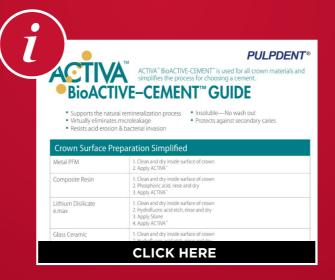
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#### ADDITIONAL RESOURCES



What is Bioactivity?



#### **ACTIVA BioACTIVE-CEMENT Guide**



Why use bioactive dental cements?