ACTIVA™ BioACTIVE

PULPDENT®
Dental Innovation Since 1947

Esthetic Bioactive Restoratives and Composites

The new standard for performance, patient care, and oral health

BioACTIVITY

What it is

What it does

How it's different

Traditional materials are designed to be passive and do no harm. This is a negative approach and does not take advantage of the benefits that can be achieved with active materials that play a dynamic role in the mouth.[2]

Bioactive Materials stimulate the natural remineralization process that helps protect teeth against caries.

Bioactive Materials are moisture friendly, transport water, and release and recharge essential minerals such as calcium, phosphate, and fluoride.

Bioactive Materials are dynamic, not passive, and in the presence of saliva they elicit a biological response that forms a layer of apatite and a natural bond between the material and the tooth.[1,2,3,4]

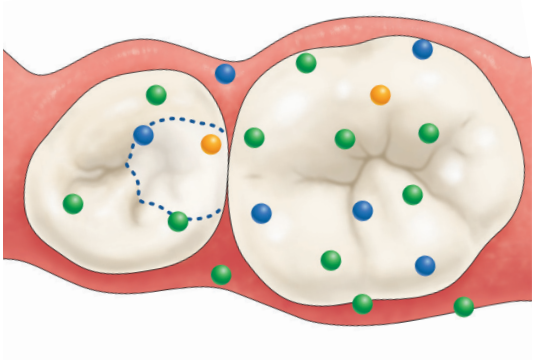
Bioactive vs. Non-Bioactive Restoratives

Bioactivity and Water

Water is the source of life. Biochemistry and bioactivity only occur in the presence of water. Only moisture friendly materials that transport water have the potential for bioactivity and can stimulate apatite formation with release and recharge of essential tooth-building minerals such as calcium, phosphate, and fluoride.

Scientific investigation confirms these bioactive properties for ACTIVA BioACTIVE.[5,6,7,8]

Continuous Exchange of Ions



There is a continuous exchange of calcium (green), phosphate (blue), and fluoride ions (orange) between the saliva, the tooth, and ACTIVA.

Properties of Bioactive vs. Non-Bioactive Restoratives

Restorative Material	Moisture friendly-transports water	Releases/recharges calcium and phosphate	Elicits a biological response that forms a natural bond	Stimulates measurable remineralization/ apatite formation
ACTIVA™ BioACTIVE	YES	YES	YES	YES
Composites	NO	NO	NO	NO
Glass Ionomers	YES	NO	YES	NO
RMGIs	YES	NO	YES	NO

Material Classifications

Bioactive materials meet prescribed criteria and should not be confused with materials classified as bio-interactive, biomimetic, or biocompatible. Bioactive materials have all these properties and more.

Bio-interactive refers to ion-releasing behavior, which can be found in materials that do not stimulate apatite formation and do not meet the requirements for bioactivity, such as glass ionomers or fluoride releasing composites.[9]

Biomimetic materials, including conventional composites, display natural function and appearance and restore tooth function,[10] but are not bioactive.

Biocompatible refers to materials that do not cause any undesirable effects in the body. All materials should meet this requirement.

The ACTIVA™ Difference

Durable and Esthetic

ACTIVA BioACTIVE is the first durable, esthetic, bioactive restorative material suitable for both dentin and enamel replacement.[11]

ACTIVA stimulates the formation of hydroxyapatite, chemically bonds to teeth, and helps protect against decay. ACTIVA is a "smart" material that responds to changes in ambient conditions and behaves much like natural teeth.

Shock-absorbing Ionic Resin

ACTIVA's patented bioactive resin matrix facilitates diffusion of ions and participates in a dynamic system of ionic exchange with saliva and tooth structure that delivers and recharges calcium, phosphate and fluoride ions. The patented rubberized-resin component provides far greater resistance to fracture and chipping than any other dental restorative material.[12,13]

Non-esthetic Bioactive Materials

Bioglass and calcium-based materials such as calcium hydroxide, MTA, calcium silicate, and calcium aluminate are bioactive. They transport water, release essential minerals, stimulate apatite formation, and promote the natural remineralization process. However, they are not esthetic materials, they are brittle, and their physical properties are not suitable for permanent esthetic restorations. They are indicated primarily for endodontic applications, pulp capping, base/liners, and cementation.

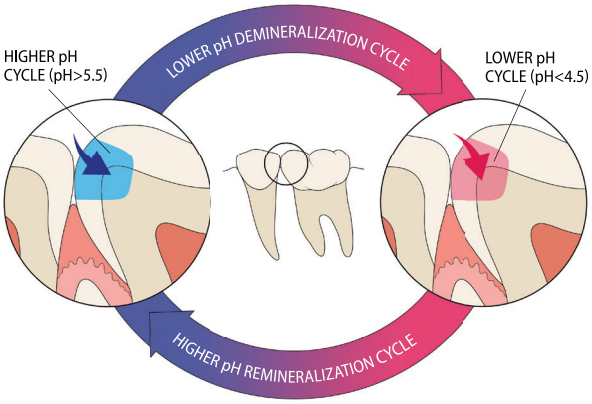
The Tooth is the Standard

Materials	Esthetic	Moisture-Friendly	Always Requires Bonding	High Strength	Releases Calcium, Phosphate	Stimulates Apatite Formation	Shock-Absorbent	Resists chipping and cracking
Tooth Structure	Yes	Yes	N/A	Yes	Yes	Yes	Yes	Yes
ACTIVA™ BioACTIVE	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Composites	Yes	No	Yes	Yes	No	No	No	No
Glass Ionomers	No	Yes	No	No	No	No	No	No
RMGIs	Yes	Yes	No	No	No	No	No	No

ACTIVA™ BioACTIVE

Dynamic Behavior Mimics Teeth

ACTIVA is a dynamic material that responds to pH cycles in the mouth. During lower pH demineralization cycles, ACTIVA releases more calcium, phosphate and fluoride ions. These ions supersaturate the saliva, and during higher pH remineralization cycles, they are available to precipitate onto the tooth in the form of hydroxyapatite or fluorapatite. Teeth behave the same way, releasing and recharging their ionic components in response to pH cycles.



Bioactive materials stimulate the natural remineralization process that strengthens teeth and helps seal them at the material-tooth interface to protect against caries.

1. Hench LL, et al. J. Biomed. Muter. Res., 2 (1972) 117-141.
2. McCabe JF, et al. Aust Dent J 2011 56 Suppl 1_3-10.
3. Jefferies SR. J Esthet Restora Dent 2014;26(1):14–26.
4. Cao W, Hench LL. Ceram Int 1996;22:493-507.
5. Garcia- Godoy F, Morrow BR. J Dent Res 95 (Spec Iss A) 1828, 2016 (www.iadr.org).
6. Chao W, Perry R, Kugel G. J Dent Res 95 (Spec Iss A) S1313, 2016 (www.iadr.org).
7. Slowokowski L, et al. J Dent Res 93 (Spec Iss A) 268, 2014 (www.iadr.org).
8. Cannon M, et al. AADR Annual Meeting 2010.
9. Gandolfi MG, et al. J Appl Biomater Funct Mater 2015;13(1):43-60.
10. Anusavice KJ, et al. In: Phillips' Science of Dental Materials. 12th ed, St. Louis: Elsevier Saunders, 2013; 519.
11. Bansal R, et al. J Dent Res 94 (Spec Iss A)_3797, 2015 (www.iadr.org).
12. Pameijer CH, et al. J Clin Dent 2015;26(1);23-27.
13. Chao W, et al. J Dent Res 94 (Spec Iss A) 2375, 2015 (www.iadr.org).

For complete references: http://www.pulpdent.com/education-articles

ACTIVA BioACTIVE
five star rating
for two years

ACTIVA BioACTIVE
gold metal
Krakow, PoLand

ACTIVA BioACTIVE
top bioactive product

Dr.Bicuspid
ACTIVA BioACTIVE
best new restorative product

PULPDENT is a family-owned dental research and manufacturing company established in 1947 and committed to product innovation, education, prevention, and patient-centered care.

PULPDENT introduced ACTIVA BioACTIVE products in 2013 and is the world leader in esthetic bioactive restorative materials. These materials provide benefits that help protect teeth against caries.

To stay updated on bioactivity and learn about the Heroic Dentistry Series, which demonstrates ACTIVA's unique capabilities, visit www.pulpdent.com/blog.

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