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Review of bioactive bioceramic materials for pediatric Dentistry

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Statement of the Problem: Inert ceramics have been used for medical devices for centuries to replace hard tissue defects, especially in teeth. In the 1990s, calcium silicate cement and later, the calcium aluminate cement, were found to be bioactive and biomineralizing. That is, they form hydroxyapatite *in vivo*. This bioactivity has led to improved outcomes for dental disease in primary and permanent teeth. Hydraulic calcium silicate and calcium aluminate cement are combined with ceramic and organic additives, which are set with water and with body fluids.

Methods: X-ray diffraction and particle size analyses were combined with published information to compare and Indications for Bioactive Bioceramic Materials contrast various products used for pediatric pulpotomies.

Findings: The bioactive bioceramic cement products for pediatric are primarily composed of tricalcium and dicalcium silicate powders, with various ceramic powders to make them radiopaque. The particle size distributions of the products have been improved (finer) and the prices have decreased over the past 20 years since their introduction to pediatric dentistry. Some products have been formulated with organic liquids or resins.

These ceramic cement perform differently *in vivo* than other pulp medicaments, bioactive glasses and so-called bioactive resimmodified glass ionomers, providing greater clinical benefit.

Conclusion: These ceramic cements are a boon for pediatric dentistry to arrest the disease, encourage reparative dentin and support healing without resorption or fixation of the pulpal tissue.



Biography

Dentist

Primus has her expertise in materials for dentistry, particularly bioactive bioceramics. Her training is in materials science and engineering. She has invented many dental products over the past 30 years, contributed chapters to books including Phillips' Science of Dental Materials and has 7 patents related to bioactive bioceramics.

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