Title: New concepts in dental glass ionomer cements
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Abstract: GICs (glass ionomer cements) have several advantages among restorative materials. These cements are adhesive to tooth structure and have desirable properties such as anticariogenic action. GICs suffer from the disadvantage of being brittle, lack of strength and toughness. Reinforcement of GICs has therefore become a matter of increasing research. The low mechanical strengths of the existing conventional formulations make the cements unsuitable for use in high stress sites such as class II and class I restorations. Efforts of improvement have been made in several aspects involving formation of different kinds of self-cured glass ionomers, water hardening versions, dual setting resin modified glass ionomers and formulation of amino acid residue-modified cements.

One idea to increasing cement strength is second phase particle reinforcement. The examples are cermets (ceramic/metal) cements. Another is incorporation of short fibers. A promising behavior has been observed by compounding alumina, carbon, silicon nitride or e-glass fibers. Also, the addition of bioactive glass to GICs compromises the mechanical properties of the material to some extent, thus their clinical use ought to be restricted to applications where their bioactivity can be beneficial like bone graft materials.

The lack of sufficient release of incorporated bioactive agents has resulted in development of GICs for biomedical applications such as nano bioceramics reinforced cements, like hydroxyapatite and fluoroapatite added cements.

A different approach is resin modified cements (RMGIs). Clinically RMGIs are used in similar indications to GICs. A rapid set makes them more attractive in patients with low compliance like children.

glass ionomer, fiber, hydroxyapatite, bioactive, reinforcement

Presentation: Poster