

Biomimetic, Bioactive Dental Implants

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Technology description

Left: 3D printed mold;Center: prototype bioactive implant;Right: prototype lateral incisor implant restored with acrylic temporary crown (after implantation).

Invention Summary:

While titanium dental implants are the current state of the art for tooth replacement, they involve an invasive surgical procedure and significant risks. Aside from intraoperative surgical risks, a high incidence of titanium implant failures has been reported after placement due to a variety of reasons including prosthetic material failures, improper surgical placement resulting in damage to adjacent teeth and vital anatomical structures, and most often are accompanied by severe bone loss when they fail.

A researcher at Rutgers has designed a customizable biomimetic implant to overcome some of these challenges and delay the need for titanium screw type implants until later in life. The implant is formed from a composite of dentin and a bioactive cement in the shape of the patient's own tooth. The rapid set time of the bioactive cement contributes to the ease and speed of fabrication. These customized implants are designed to be patient and extraction site specific, eliminating the need for drilling and screwing the implant into bone.

Both the composition and the geometry contribute to the integration of the implant to the patient's jawbone.

Application area

Transitional dental implants

Long term dental implants

Dental implants in children and young adults

Advantages

Inexpensive materials and equipment

Chairside fabrication

Rapid set time (12 minutes)

Compressive strength exceeds masticatory (bite) forces

Use in children and young adults (6-21 years), currently impossible with titanium implants
Patient-specific geometry
Integration of bioactive composite with jaw

Institution

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