CERAMENT® | BONE VOID FILLER
Rapid and complete bone remodeling
CERAMENT® BONE VOID FILLER

CERAMENT® is an injectable, moldable, drillable and radiopaque bone substitute which provides rapid and complete bone remodeling within 6-12 months\textsuperscript{1,2,3}.

Unique features:

- **Injectable, Moldable, Drillable**\textsuperscript{1,2,3}
- **Rapid and complete bone remodeling**\textsuperscript{1,2,3}
- **Highly visible under fluoroscopy**\textsuperscript{2}
- **30 second, enclosed mix**
- **Not temperature sensitive**
- **Non-exothermic**
- **Robust clinical data**

Consistent mixing and handling that is true to the time chart

\[0 \quad 30s \quad 3 \text{ min} \quad 5 \text{ min} \quad 7 \text{ min} \quad 9 \text{ min} \quad \sim 15 \text{ min}\]

REFERENCES
How CERAMENT® remodels bone

**UNIQUE COMPOSITION**
CERAMENT® is composed of 40% hydroxyapatite (HA) and 60% calcium sulfate (CaS), and a radiopacity enhancing agent for visibility under fluoroscopy.

**IMPLANTED**
High flowability enables injection through narrow needles and ensures an excellent spread in the trabecular system.

**BIOACTIVE**
A layer of native HA forms on the surface of CERAMENT® and retards the CaS resorption. Contact with bone is enhanced because the bone cells recognize the apatite layer as natural bone mineral.

**OSTEOCONDUCTIVE**
HA particles are delivered by the CaS and create a scaffold. After the CaS has resorbed, new bone will completely surround and embed the HA particles.

**BONE FORMATION**
Early vascularization and invasion of osteoblasts enable multiple site formation of bone throughout the cured CERAMENT®.

**Proprietary Composition**
CERAMENT® consists of 40% hydroxyapatite (HA) and 60% calcium sulfate (CaS). The addition of a liquid radiopacity enhancing agent provides for an injectable paste which is radiographically visible.

The CaS works as a delivery tool for the osteoconductive HA.
Proven Results

Case 1: Trauma

Bicondylar Osteoporotic Tibial Plateau Fracture

A female (88 years old) underwent open reduction and internal fixation of angulated, impacted, displaced and unstable left tibial plateau bicondylar fracture, with percutaneous lateral plate application.

CERAMENT® BONE VOID FILLER was injected to fill resulting void after fracture reduction. Fig A & B.

At 18 months patient was clinically improved and ambulating well.

Radiographs showed remodeling of CERAMENT® BONE VOID FILLER into new bone. Fig C & D.

More than 9 years of clinical evidence, more than 40 pre-clinical and clinical studies and four year patient follow-up data, demonstrate the safety, efficacy and long-term bone remodeling capabilities of CERAMENT®.

Credit:
Dr. Prashant Desai, D.O.
Lakeland Regional Medical Center, Lakeland, Florida, USA
Case 2: Reconstructive Orthopedics

Hip Revision

A 61-year old male with a history of well-positioned, well-functioning bilateral uncemented THAs presented with progressive left hip pain over 6 months.

X-rays showed a large cystic osteolytic lesion in the left acetabulum involving the superior dome and the medial wall with extension into the ischium. CT scan confirmed extensive amount of osteolysis.

Intraoperatively, significant wear of the polyethylene liner allowing subluxation of the femoral head was found. The cup was solidly fixed and was not revised. The femoral head was exchanged for a new 32 mm head and the liner was exchanged to a 10-degree elevated lip liner.

A 2x2cm window was made above the acetabulum at the level of the cyst.

The cyst was curetted and filled with 32cc CERAMENT®|BONE VOID Filler (Fig. 1). Once CERAMENT® had set, the wound was irrigated and closed.

At 6 weeks post-op, the patient had good and painless range of motion and was weight-bearing without aides. X-rays confirmed good positioning of the acetabular implant CERAMENT® is still visible (Fig. 2). At 11 weeks post-op, CERAMENT® is no longer visible (Fig. 3).

At 8 months post-op, the patient was doing well and was pain-free. X-rays demonstrated CERAMENT® to be nearly completely resorbed and replaced with new cancellous bone (Figs. 4 & 5).

Credit:
Thomas Baier, M.D.
Advocate Condell Medical Center, Libertyville, IL USA
Case 3: Foot and Ankle

Treatment of displaced intra-articular calcaneal fracture

A female (54 years old) with a displaced intra-articular calcaneal fracture had open reduction and internal fixation (ORIF) (Fig. A). The resulting bone void after fracture reduction was filled with CERAMENT® BONE VOID FILLER.

Removal of the plate at 5 months due to pain (no signs of infection) facilitated a bone biopsy which showed early signs of new bone growth where CERAMENT® was implanted (Fig B).

At 7 months the patient demonstrates a good result and is fully weight-bearing. (Fig. C).

Figure A. X-ray immediately post surgery.

Figure B. Histology at 5 months showing new bone growth.

Figure C. X-ray after removal of the plate and is fully weight-bearing.

Credit:
Damiano Papadia
Reparto di Ortopedia e Traumatologia
Ospedale, Santa Chiara, Trento, Italy
Case 4: Ortho-Oncology

Minimally Invasive Treatment of a Benign Proximal Humeral Cyst

Large unicameral bone cyst (UBC) of the proximal humerus with thinning of proximal cortices (Fig. 1).

The cyst was aspirated using a large-bore needle then exchanged for a cannula for pressure relief during injection of CERAMENT® BONE VOID FILLER (Fig. 2, 3).

An additional cannula was placed into the distal part of the cyst. The CERAMENT® BONE VOID FILLER delivery syringe was attached to the end of the distal cannula and injected one minute after mixing to ensure complete filling of the void via a bottom-to-top (distal to proximal) technique.

30cc of CERAMENT® BONE VOID FILLER was injected. Iohexol provides visibility of product under fluoroscopy (Fig. 3) and the post-operative radiograph (Fig. 4).

6 week X-ray demonstrates a white ‘halo effect’ outlining the cyst (Fig. 5). At 3 months, early bone remodeling is seen, along with a ‘puddling effect’ at bottom of cyst (Fig. 6).

5 month X-ray shows on-going replacement of CERAMENT® BONE VOID FILLER with new cancellous bone (Fig. 7).

Credit: Joseph Benevenia, M.D. Rutgers University Hospital, Newark, NJ
Ordering Information

<table>
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<tr>
<th>Product</th>
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<th>Zimmer Biomet Codes (good through 5/20/19)</th>
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