Use of CERAMENT™ as a Bone Void Filler in Complex Foot and Ankle Reconstruction

Lawrence A. DiDomenico, DPM, FACFAS
Adjunct Professor, Kent State University College of Podiatric Medicine, Cleveland, Ohio USA
Director, Reconstructive Rearfoot & Ankle Surgical Fellowship, Ankle and Foot Care Centers/Kent State University College of Podiatric Medicine
Section Chief of Podiatry, St. Elizabeth’s Medical Center – Youngstown, Ohio
Ceramic bone substitutes are ideal matrices for bone ingrowth because the bio–organic component of bone is comprised of hydroxyapatite \(^1\).

Calcium phosphate–based bone substitutes have been demonstrated to be safe and effective in trauma applications \(^2-4\).

CERAMENT™ comprises flowable hydroxyapatite particles with a setting calcium sulfate paste delivering an immediate setting strength.
• Bone healing demonstrated via histology in pre-clinical small animal models\textsuperscript{7-9}

• Demonstrated to be safe and effective in spine\textsuperscript{10}, trauma\textsuperscript{11}, and foot & ankle\textsuperscript{12} clinical applications with full bone remodeling within a year \textsuperscript{11}

• Decided to try CERAMENT\textsuperscript{TM} initially in conjunction with allograft, and/or allograft in foot and ankle reconstruction, to seal around the graft for containment and to fill residual voids because of its injectability and full setting within one hour

• Based on the clinical success of this application in my practice, I have increased my use of CERAMENT\textsuperscript{TM} as a primary bone graft substitute in selected cases
57 year old white male with a long standing mid foot diabetic ulcer secondary to a neuropathic charcot deformity.

Instability at the ankle & subtalar joint, as well as the mid-foot.

Talar head exposed; osteomyelitis diagnosed via bone biopsy.
Initial Treatment

- Gastrocnemius recession & application of an external fixator for realignment & stabilization

- Bone debridement followed by intravenous antibiotics and local wound care.

- At approximately 6 weeks the wound was resolved & infection markers improved.
Stage 1 Reconstruction: Ankle

- Reconstruction planned in 2 stages to provide stability of ankle & mid-foot to prevent reoccurrence.

- The first stage consisted of a complete talectomy and application of an intramedullary retrograde nail.

- The talus bone void was replaced with a combination of allogenic bone soaked in autologous blood.

- Cerament™ used to enhance cancellous bone integrity and fill in any residual gaps.
2nd stage reconstruction of mid-foot was performed eight weeks after ankle reconstruction & evidence of bony consolidation.

Bone resection arthrodesis via locking plate.

The resected bone void was backfilled as before with the allogenic bone and autologus blood composite.

Cerament™ used to enhance cancellous bone integrity and fill in any residual gaps.
For each reconstruction, the patient was postoperatively immobilized for 2 months.

At four months from the second reconstruction (mid-foot), the patient was full weight bearing.

Subsequent to the second reconstruction, transformation to solid bone progressed at each monthly visit.

At six months, the bone appears to
A Clinical View: Post-op thirty-two months. This demonstrates a successful plantar-grade, stable foot & ankle, free of ulcer & infection.

Such a positive result has been typical in my eclectic series of foot & ankle reconstructions utilizing CERAMENT™.