

Engineered Bone Graft

Exactech

(<http://www.exac.com/products/biologics/optecure-optecure-ccc>)

Optecure+ccc



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Autogenous bone graft remains the standard for augmenting the surgical care of severe fractures, promoting spinal fusion, filling bone voids, and treating nonunions. However, lingering problems with donor site morbidity, volume limitation, increased operative time, and increased case complexity have led to the growing use of bone graft substitutes.¹

These alternatives include allograft bone, demineralized bone matrix, calcium sulfate and calcium phosphate, bioglass, growth factors (rhBMP-2, rhBMP-7, rhPDGF, and PRP [platelet-rich plasma]), collagen matrix, and new cellular-based compounds using mesenchymal stem cells. Since each individual class of bone substitute falls short of the optimal blend of osteoconduction, osteoinduction, and osteogenesis, novel composite grafts have been developed to combine the convenience, durability, and flexibility of synthetic grafts with the biologic activity of native bone.

Optecure+ccc (Exactech) is an engineered composite bone graft that contains demineralized bone mixed with gamma irradiated cortical cancellous chips in an absorbable synthetic hydrogel matrix (**Figure**). When mixed with saline, blood, autogenous bone, bone marrow aspirate, or PRP, it becomes a surprisingly robust and malleable 3-dimensional matrix that allows easy bone void filling with excellent osteoconductive and osteoinductive characteristics. Each individual lot is tested for sterility and endotoxin levels to confirm safety as well as in vivo testing in athymic mice to confirm osteoinductive potential. Optecure+ccc has been successfully used to augment healing when combined with bone marrow aspirate in minimally invasive spine fusion surgery.²

Surgical pearl: I treat a large number of bicycle injuries on Nantucket; many are quite serious. I have found Optecure+ccc to be particularly useful during locked volar plating of severe distal radius wrist fractures as a way to restore and support radial length when autogenous bone

access is limited. In this application, Optecure's ability to expand and mold into a functional bone scaffold is critical to create a stable, stress-resistant fracture construct.

After exposure of the comminuted fracture line of the distal radius, gentle axial traction is applied and a small osteotome or freer is used to carefully wedge open the cortex to allow metaphyseal window access. The Optecure+ccc is mixed with either blood or bone marrow aspirate to reach a "grape nuts cereal"-like consistency and then carefully packed into the metaphyseal window to backfill the void. Multiplanar fluoroscopy is used to monitor graft placement and gradual joint line restoration. Traction is then released after the void is filled sufficiently to support the provisional reduction. Additional grafting with



Figure. Optecure+ccc can be combined with autologous blood or bone and easily molded for grafting.

standard Optecure without bone chips can be used to fill more difficult-to-access areas. Both forms of Optecure are resistant to diluent migration, giving them good intraoperative behavior. Excess graft can be easily wiped away from the fracture site prior to plate application.

After elevation and restoration of the joint line, the locking volar plate is then affixed, wrist alignment confirmed fluoroscopically, and the procedure completed. The result is a well-filled void and an improved fracture construct. While Optecure+ccc has proven its battle readiness in wrist fracture surgery, I have also found it very helpful in reconstructing complex proximal humerus and clavicle fractures. Its unique combination of intraoperative versatility and durability provides a welcome edge in challenging cases.

1. Rodgers WB, Gerber EJ, Patterson JR. Fusion after minimally disruptive anterior lumbar interbody fusion: analysis of extreme lateral interbody fusion by computed tomography. *SAS J.* 2010;4(2):63-66.
2. Sasso RC, LeHuec JC, Shaffrey C; Spine Interbody Research Group. Iliac crest bone graft donor site pain after anterior lumbar interbody fusion: a prospective patient satisfaction outcome assessment. *J Spinal Disord Tech.* 2005;18 Suppl:S77-S81.

Author's Disclosure Statement: Dr. Monto reports that he is a consultant to Exactech.