

OPENING WEDGE OSTEOTOMIES WITH OSTEOCURE

Robb Mothershed, DPM

INTRODUCTION

The use of bone grafting in foot and ankle surgery is necessary for a variety of procedures. The Evans osteotomy and the Cotton osteotomy are commonly utilized to correct rearfoot valgus disorders in juvenile patients. The use of an autograft is the safest and most effective, although the creation of a second surgical site can increase the risk of complications. The use of bone bank bone grafts have been the mainstay for many years. With the use of these grafts, there is an inherent risk of disease transmission, although all of the grafts undergo a number of steps to process and sterilize the grafts. The only reported cases of disease transmission have been with fresh frozen grafts and not processed grafts. The development of synthetic bone grafts that have osteoinductive and osteoconductive properties have provided an alternative to autografts and allografts. As surgeons, we are constantly trying to improve existing techniques and the materials that we use.

OSTEOCURE GRAFT

A variety of synthetic bone grafting materials are currently available to surgeons. Each of these grafts has its own inherent characteristics that make it unique. A new type of synthetic bone graft is OsteoCure (Nexa Orthopedics, San Diego, CA). OsteoCure is a synthetic graft material that is composed of 2.5% polyglycolic acid, 10% calcium sulfate, 12.5% poly D,L lactide-co-glycolide, a trace amount of surfactant, and 75% of the graft has pores (Figure 1). The polyglycolic acid is preferentially aligned in one direction to provide structure and strength. The calcium sulfate component encourages bone growth. The poly D,L lactide-co-glycolide is an amorphous copolymer that provides a scaffold in the graft. The surfactant component of the graft provides a hydrophilic property. The pores within the graft measure 500-600 μm , which is similar in size to human cancellous bone (500 μm). The pores in OsteoCure provide space for uptake of cells and nutrients and later bony ingrowth. The biologic structure of the OsteoCure is comprised of clinically proven materials that are found in other medical devices.

OsteoCure wedges are available in five different height and angle configurations for surgical implantation.

Resorption of OsteoCure begins immediately with implantation of the wedge. The incorporation of the graft can easily be followed with standard radiographs. The hydrophilic properties of the scaffold allow for blood to be wicked into the pores. The calcium sulfate within the graft dissolves between 6 weeks and 6 months as new tissue has formed within the pores. The polymer within the graft is resorbed and replaced with new tissue between 6 and 12 months. After 12 months the graft has completely resorbed and the defect contains entirely new tissue.

USE IN THE EVANS

The Evans osteotomy has been the primary area for use of the OsteoCure graft. The standard osteotomy is performed in the lateral wall of the calcaneus 1.5 centimeters proximal to the calcaneal-cuboid joint. The graft is not reconstituted as you would with typical allograft because the graft will lose some of its handling characteristics. The appropriate sized wedge can easily be fashioned with a sagittal saw, although no irrigation should be used with cutting of the graft (Figure 2). It is necessary to distract the osteotomy open as much as possible to stretch the lateral tissues before inserting the graft (Figure 3). The wound is flushed before



Figure 1. OsteoCure wedge form Nexa Orthopedics (San Diego, CA).

the graft is inserted to prevent saline uptake by the graft. The graft can be tapped into the osteotomy with a bone tamp and mallet (Figure 4). The alignment of the foot and ankle are checked clinically and with c-arm. Standard closure of the wound is then carried out and the same procedure may be repeated if a Cotton osteotomy needs to be performed. The patient is placed in a nonweightbearing cast for 6 weeks and then into an aircast walker for 1 to 2 weeks and then back into a tennis shoe with an orthotic.

Most of the grafts that were used by the author have incorporated in 3 to 6 months without any complications (Figure 5). The grafts do seem to incorporate faster than traditional bone bank bone grafts. None of the patients had any type of soft tissue reaction following the surgery

or increase in pain. The patients did recover from the procedures in the same amount of time as with patients who underwent the traditional technique. Currently, there is no literature discussing the use of OsteoCure in podiatric or orthopedic surgery. The new graft appears to be safe and effective in open wedge osteotomies of the lower extremity and has similar cost to bone bank bone graft.

BIBLIOGRAPHY

Blitch EL, Pachuda NM, Karlock LG, Mahan KT. Bone grafts. In: Banks AS, Downey MS, Martin DE, Miller SJ, eds. *McGlamry's Comprehensive Textbook of Foot & Ankle Surgery*, 3rd edition. Philadelphia: Lippincott, Williams & Wilkins; 2001. p. 1465-86.

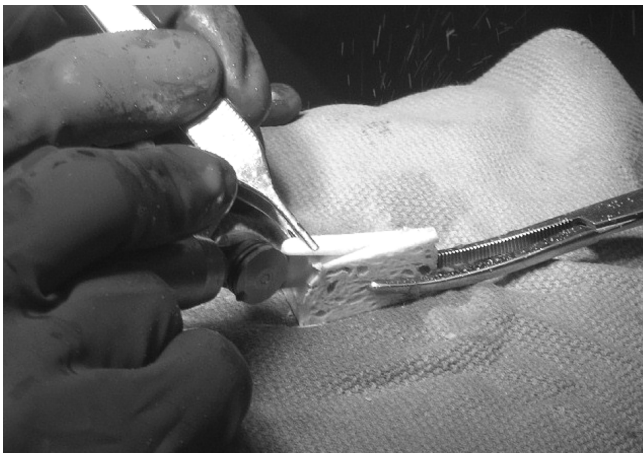


Figure 2. The graft is cut with a saw and no irrigation is used.

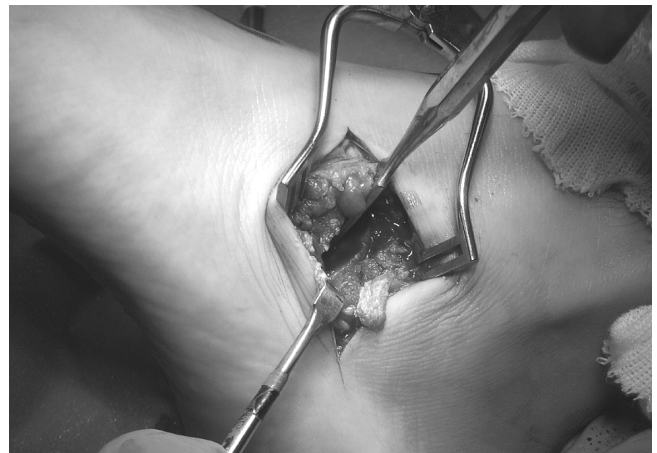


Figure 3. The osteotomy needs to be manipulated open to accommodate the graft.

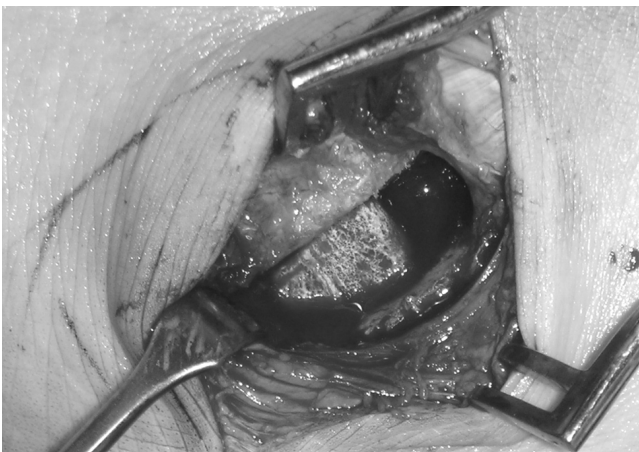


Figure 4. The graft is inserted flush with the lateral wall of the calcaneus.



Figure 5. The incorporation of the graft is followed with radiographs (3 months postoperative).