

## Technique for Antibiotic-Laden Polymethyl Methacrylate Cement Bead Creation for Use in Open Fractures

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### Introduction

The indications for polymethyl methacrylate (PMMA) antibiotic beads are any open fracture with gross contamination, a large zone of injury, and/or devitalization of tissue. PMMA beads can be used in sterile wounds and minimize the risk of osteomyelitis.

### Purpose

This video demonstrates the technique for antibiotic laden PMMA cement bead creation for use in open fractures.

### Methods

To optimize the efficacy of PMMA antibiotic beads, a minimum of 5 g of at least two synergistic antibiotic agents is recommended for each 40-g packet of cement. The typical antibiotic agents used in this video for one packet of cement are 2 g vancomycin powder, 3.6 g tobramycin powder, and 240 mg liquid gentamycin. A case study is used to demonstrate the technique of antibiotic bead creation. The patient is a 23-year-old male motorcyclist who was struck by a car and sustained a grade IIIA open comminuted and displaced intra-articular distal femur and femoral shaft fracture with a 4 cm wound overlying the patellar tendon.

### Results

As far back as 1990, PMMA antibiotic beads have been shown to decrease the rate of infection in patients with an open fracture. PMMA beads can decrease biofilm formation of methicillin-resistant *Staphylococcus aureus* and *S epidermidis*. Surgeon-created beads are considerably less expensive than commercially available beads and may contain higher antibiotic concentrations. The maximum elution concentration of antibiotic agents from PMMA beads occurs within 48 to 72 hours and has a half-life ranging from 6 to 10 days.

### Discussion

PMMA antibiotic beads are easy to create in the operating room, and antibiotic concentration can be optimized for use in open fractures that are grossly contaminated and require serial débridement. Their use has been shown to decrease infection rates in open fractures; therefore, they should be liberally used for these injury types.