

Fabricating Large-Diameter Antibiotic-Coated Interlocking Nails of any Size with Limited Resources: A Technical Trick

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Purpose: The treatment of long bone fracture-related infection and nonunion is challenging. Many techniques for antibiotic-coated nails have been described. In select instances, a single-stage large-diameter antibiotic-coated interlocking nail (LDACIN) can be utilized. Unfortunately, the diameter of many commercially available products (chest and cardiac tubing, custom molds) limits the maximal final diameter of the construct. Many centers lack readily available resources required for fabrication, particularly in the developing world where supplies can often be limited. We describe a simple technical trick that allows for customization and fabrication of an LDACIN of any diameter.

Methods: Canals were reamed to 1.5 mm larger than planned final diameter of the LDACIN. Commercially available standard trauma interlocking nails were utilized. The nail was roughened on the back table with a universal chuck or bone rasp to enhance cement bonding. The desired volume of antibiotic powder was hand mixed with 2 batches of cement using previously described techniques. Bone wax was used to temporarily block nail interlocking holes. The nail was then coated entirely by hand in a uniform fashion with a desired goal of an additional 1 to 2-mm circumferential cement mantle. Using the plastic portion of a commercially available suture packet, a sizing hole was cut with an 11-blade scalpel to 1 mm larger than the predetermined final construct diameter to serve as a sizing guide. When available, a comparison template was also used to confirm the final desired diameter. The cured implant was then inserted over a guidewire and standard interlocking screws were implanted.

Results: All LDACINs were able to be successfully sized and passed over a guidewire with this technical trick.

Conclusion: Using this technical trick, LDACINs of any size can be fabricated with limited resources in a reliable and reproducible fashion.

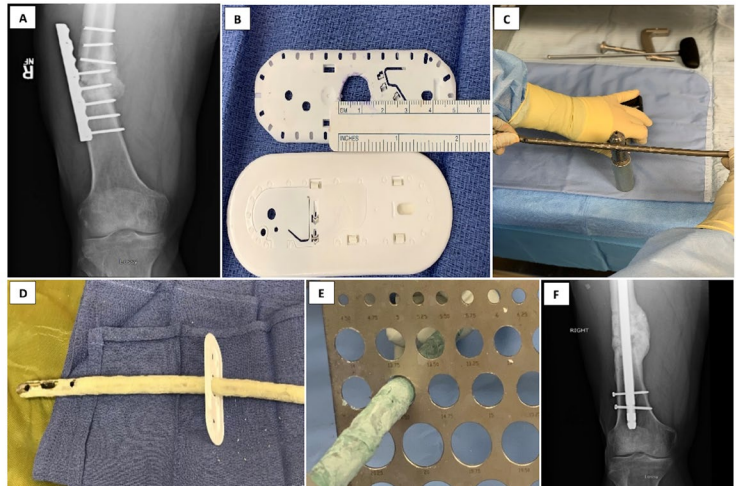


Figure 1 (a) AP femur radiograph demonstrating catastrophic hardware failure following treatment of *Streptococcus anginosus* osteomyelitis. Based on clinical and host factors, a single-stage large diameter antibiotic coated interlocking nail was selected. (b) A 12mm nail was selected after reaming to 15mm. A 14.5mm hole was then cut in the plastic portion of a suture packet to allow for an anticipated 1.5mm cement mantle. (c) The nail surface is roughened to increase bonding of the antibiotic laded polymethylmethacrylate. (d) The customized plastic sizing guide is used to assess final construct diameter to ensure the nail will pass through the reamed canal. (e) A comparison template (Zimmer Biomet, Warsaw, IN) can also be used to assess final desired construct diameter. (f) Final AP radiograph at 12 months demonstrating osseous union, no evidence of infection recurrence and no hardware related complications.

TECHNICAL TRICKS AND TIPS

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.