



## Management of Below the Knee Amputation (BKA) Stump Breakdown Using Antibiotic-loaded Synthetic Calcium Sulfate Beads: A Case Series

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**Title:** Management of Below the Knee Amputation (BKA) Stump Breakdown Using Antibiotic-loaded Synthetic Calcium Sulfate Beads: A Case Series

**Background:** Lower extremity amputation remains a clinical challenge despite advances in wound care. For patients who require BKA, preservation of limb length optimizes functional outcome. However, efforts to salvage the knee joint are associated with higher morbidity and wound healing complications, often leading to above the knee amputation (AKA). The decision to perform a BKA or AKA is based on clinical and diagnostic evaluation of the potential viability of the BKA stump. Preoperative evaluation does not ensure that stump healing will occur and the decision to perform a BKA or AKA ultimately rests with the surgeon. The use of antibiotic beads lowers the threshold for performing a BKA.

**Hypothesis/Purpose:** Does local delivery of antibiotics promote healing in BKA stump breakdown?

**Methods:** A standard formula of vancomycin and gentamycin is combined with synthetic calcium sulfate powder and allowed to set. After debridement, antibiotic beads are implanted and secured by primary closure or an occlusive dressing sutured to the site. The dressing remains in place for one week and the patient is reevaluated regularly at the wound clinic. The beads are not always removed and are often resorbed.

**Results:** Seven diabetic patients with BKA stump wounds unresponsive to aggressive local therapy were treated with antibiotic beads: 4 for postoperative surgical wound dehiscence, 2 with stump trauma, and 1 with a chronic pressure wound over the tibia. The number of treatments ranged from 1-9. Time to wound closure after the first treatment ranged from 6-27 weeks. All BKA stump wounds remain resurfaced.

**Discussion:** Systemic antibiotics do not adequately penetrate wound biofilm. Local delivery of antibiotics can provide high tissue antimicrobial concentration without associated systemic toxicity. This is particularly relevant in this population with marginal distal perfusion. Synthetic calcium sulfate has been successfully used as a biodegradable carrier for the local delivery of antibiotics with predictable elution properties. Vancomycin and gentamycin are commonly used because of their broad spectrum coverage. Antibiotics directed at different cultures may also be used.

**Conclusion:** Preservation of limb length following amputation is an important clinical goal. Implantation of synthetic calcium sulfate antibiotic-loaded beads is a promising adjuvant for management of BKA stump breakdown.