

## The Use of STIMULAN Resorbable Antibiotic Beads in Conjunction with Autologous Tissue Transfer to Treat Recalcitrant Infections and Osteomyelitis in Diabetic Foot Wounds

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**Abstract :** Introduction: Chronic lower extremity wounds in the diabetic and vasculopathic populations are associated with a high degree of morbidity. When wounds require more extensive treatment than can be offered by wound care centers, more aggressive solutions involve local tissue transfer and microsurgical free tissue transfer for achieving definitive soft tissue coverage. These procedures of autologous tissue transfer (ATT) offer resilient, soft tissue coverage of limb-threatening wounds and confer promising limb salvage rates. However, chronic osteomyelitis and recalcitrant soft tissue infections are common in severe diabetic foot wounds and serve to significantly complicate ATT procedures. Stimulan is a resorbable calcium sulfate antibiotic carrier. The use of stimulan antibiotic beads to treat chronic osteomyelitis is well established in the orthopedic and plastic surgery literature. In these procedures, the beads are placed beneath the skin flap to directly deliver antibiotics to the infection site. The purpose of this study was to quantify the success of Stimulan antibiotic beads in treating recalcitrant infections in patients with diabetic foot wounds receiving ATT. Methods: A retrospective review of clinical and demographic information was performed on patients who underwent ATT with the placement of Stimulan antibiotic beads for attempted limb salvage from 2018-21. Patients were analyzed for preoperative wound characteristics, demographics, infection recurrence, and adverse outcomes as a result of product use. The primary endpoint was 90 day infection recurrence, with secondary endpoints including 90 day complications. Outcomes were compared using basic statistics and Fisher's exact tests. Results: In this time span, 14 patients were identified. At the time of surgery, all patients exhibited clinical signs of active infection, including positive cultures and erythema. 57% of patients (n=8) exhibited chronic osteomyelitis prior to surgery, and 71% (n=10) had exposed bone at the wound base. In 57% of patients (n=8), Stimulan beads were placed beneath a free tissue flap and beneath a pedicle tissue flap in 42% of patients (n=6). In all patients, Stimulan beads were only applied once. Recurrent infections were observed in 28% of patients (n=4) at 90 days post-op, and flap nonadherence was observed in 7% (n=1). These were the only Stimulan related complications observed. Ultimately, lower limb salvage was successful in 85% of patients (n=12). Notably, there was no significant association between the preoperative presence of osteomyelitis and recurrent infections. Conclusions: The use of Stimulan antibiotic beads to treat recalcitrant infections in patients receiving definitive skin coverage of diabetic foot wounds does not appear to demonstrate unnecessary risk. Furthermore, the lack of significance between the preoperative presence of osteomyelitis and recurrent infections indicates the successful use of Stimulan to dampen infection in patients with osteomyelitis, as is consistent with the literature. Further research is needed to identify Stimulan as the significant contributor to infection treatment using future cohort and case control studies with more patients. Nonetheless, the use of Stimulan antibiotic beads in patients with diabetic foot wounds demonstrates successful infection suppression and maintenance of definitive soft tissue coverage.

**Keywords :** wound care, stimulan antibiotic beads, free tissue transfer, plastic surgery, wound, infection

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