

## Protecting Your Prosthesis from Pathogens: Management and Outcomes of Infections Following Osseointegrated Implantation in Lower Limb Amputees

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**Purpose:** Osseointegrated prostheses are a novel alternative to traditional socket-suspended prostheses for lower limb amputees. They eliminate the socket-skin interface and allow for weight-bearing directly on the skeletal system, which can reduce pain and improve mobility. However, the stoma through which the osseointegrated implant attaches the external prosthesis creates an ingress route for bacteria, and infection rates as high as 66% have been reported. These infections may lead to osteomyelitis and weaken the integrity of the bone-implant interface. The aims of this study are to classify the types and time courses of infections, their treatment protocols, and the long-term outcomes in this patient population.

**Methods:** An IRB-approved retrospective analysis was performed on all patients who received lower-limb osseointegration at our institution between 2017 and 2022. Diagnostic and treatment data were collected for all patients with clinically diagnosed or culture-proven infections. Patients were stratified by infection type, then Chi-squared and unpaired t-tests were performed on categorical and continuous data, respectively, using a p-value cutoff of 0.05.

**Results:** 40 patients met our study criteria, with a total of 50 infections. This cohort included 20 males and 20 females with 21 transfemoral and 19 transtibial amputations. There were 28 (56%) superficial stomal infections, 15 (30%) deep soft tissue infections, and 7 (14%) cases of osteomyelitis. The most common pathogens were *Staphylococcus aureus* (10), *Streptococcus agalactiae* (6), and *Staphylococcus epidermidis* (5). Osteomyelitis cases were significantly more likely than stomal infections to be polymicrobial and more likely to contain gram-negative microorganisms (e.g., *Pseudomonas aeruginosa*, *Klebsiella oxytoca*) ( $p < 0.03$ ). These infections appeared at a median of 102 days after implantation (range: 19 – 1,064 days) and did not differ between groups. All infections were treated with oral or intravenous antibiotics, with mean durations of 24 and 36 days, respectively. Additionally, 2 (7%) stomal infections, 2 (13%) deep soft tissue infections, and 5 (71%) cases of osteomyelitis required reoperation with washout and/or debridement ( $p < 0.001$ ). 2 (29%) patients with osteomyelitis underwent explantation. The overall implant salvage rate was 96% across all infections.

**Conclusions:** This study describes our institution's experience managing infection after osseointegrated implantation and soft tissue reconstruction. Early clinical assessment and appropriate treatment is essential to prevent progression of soft tissue infection to osteomyelitis, which carries greater risk of reoperation and explantation. Understanding the pathogenesis, microorganisms involved, and successful management of these infections will be essential for plastic surgeons engaging in this growing field.