

Assessing Sterility of the Surgical Field During Septic and Aseptic Revision Arthroplasty

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INTRODUCTION: Turning over the sterile field during revision knee arthroplasty (rTKA) has been suggested as a means of preventing periprosthetic joint infection (PJI). The rationale behind changing drapes, instruments and gowns is that bioburden, either from the operative room/team, or from the wound, can deposit in the sterile field and can be transferred into the surgical wound prior to closure. To date, no comprehensive evaluation of the sterile field for evidence of viable bioburden has been performed.

METHODS: Eight patients undergoing both component rTKA (3 due to PJI, 5 due to aseptic indications) were prospectively consented. Following debridement and component removal, 5 locations within the sterile field were swabbed: 1) incise drapes, 2cm away from the wound, 2) drape directly underneath the knee, 3) plantar aspect of the foot, 4) the Mayo stand where surgical instruments were placed, 5) the chest area of the surgeon's gown. Swabs were separately sent for metagenomic sequencing (bacterial DNA/RNA was detected using established thresholds) and immediate ATP testing using a luminometer to identify that viable organisms were present.

RESULTS: Bacterial DNA/RNA was detected on 80% (9 of 15) of surfaces in PJI cases and 76% (19 of 25) in aseptic cases. The organism causing PJI was also found within the sterile field in 1 of 3 PJI cases (*S. aureus*). In both infected and aseptic cases, the presence of *C. acnes*, *P. aeruginosa*, and low reads of *E. coli* were detected. ATP testing detected high activity across septic and aseptic procedures, with no difference between the two ($p=0.37$). The surgeon's gown, mayo stand, and patients' foot were the most common sites for positive bacterial DNA/RNA (7 out of 8 samples, 87.5%).

DISCUSSION AND CONCLUSION:

Bacterial DNA/RNA is present in multiple locations within the sterile field during rTKA surgery, with positive ATP activity suggesting that the pathogens are viable. The clinical implications of these findings remain unclear. Turning over the sterile field during rTKA may be prudent to reduce bioburden and subsequent infection risk.