

**HK60: During single-stage exchange arthroplasty, should we use two separate instrument setups and re-drape single-stage exchange arthroplasty, should we use two separate instrument setups and re-drape after resection?**

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**Response/Recommendation:**

Yes. The use of two separate instrument setups and the use of new drapes after resection in single-stage exchange arthroplasty are associated with a lower risk of contamination and the possibility of infection recurrence.

**Level of Evidence:** Limited

**Delegate Vote:**

**Rationale:**

Recurrence of periprosthetic joint infection (PJI) remains a significant challenge in revision arthroplasty. Single-stage exchange arthroplasty is increasingly utilized as an alternative to two-stage exchange; however, the utility and optimal intraoperative protocol to minimize contamination and reduce reinfection rates remain debated. Protocols with descriptions of two separate setups and, in some instances, of two separate rooms have been described.[1-4] While some

surgeons favor a single sterile field for the entire procedure, concerns regarding bacterial and intraoperative contamination have driven the exploration of using two separate instrument setups with redraping, or the use of a new drape, after the resection arthroplasty is completed.[1] This review evaluates whether employing two separate instrument setups and redraping after resection reduces the risk of infection recurrence in single-stage procedures and discusses potential barriers to the widespread adoption of this practice.

A comprehensive literature search was conducted using PubMed and Embase, initially identifying 19 potentially relevant studies. These were then screened by two independent reviewers, from which seven were selected for in-depth review.

It is well known that bacterial contamination increases with the time surgical trays are opened and the duration of the surgical procedure. [5, 6] Although Russell et al. failed to demonstrate the time-dependent nature of contamination, this was a limited cohort that did not evaluate the setting of PJI treatment.[7] Beldame et al. found that contaminations and glove perforation increased during certain aspects of total hip arthroplasty.[8] While these organisms were felt to be cutaneous and originating from the surgeon, other studies have found bacterial contamination to be from the infected patient. In a prospective collection of swab samples from multiple surgical surfaces (gloves, gown, patient, scalpel, and light handle) during revision arthroplasty, it was found that the surfaces were significantly more contaminated (77%) compared to aseptic revisions (13%). Often, the contaminating organism was the same organism found in cultures from the septic revision.[9] Given that the surgical site gets contaminated, it is relevant to question whether interventions to decrease the bacterial burden are sufficient. Morrison et al. conducted a randomized controlled trial comparing single versus repeat surgical preparation. They found that repeated skin antiseptic preparation before closure resulted in a reduction in surgical site infections. Although there was no exchange of drapes, this randomized controlled study demonstrates a significant decrease in the risk of superficial surgical site infection (6.5% vs 1.8%,  $p = 0.02$ ) with the simple step of re-prepping the surgical site.[10]

Maale et al. reported an 88% success rate in single-stage procedures using a dual setup.[11] Similar reports adopting the European models for single-stage arthroplasty have led to increased utilization. El-Husseiny et al. included a redraping step in complex reconstructions and reported an infection control rate of 83%.[12] The question of whether a separate instrument setup and re-preparation are worthwhile, from a time and cost standpoint, remains a critical discussion point. Single-stage procedures inherently attempt to avoid the costs of an entire second admission and second-stage surgery, albeit with the trade-off of prolonged primary surgery. For such a protracted and expensive procedure, the additional costs of re-prepping, redraping, and setting up extra instruments are relatively negligible.

Katakam et al. evaluated a dual surgical setup in debridement and implant retention procedures (DAIR) and demonstrated a significant reduction in infection recurrences when a new sterile field was established. This group found that when the entire retrospective cohort of 263 patients was stratified by setup type (single vs. dual), the infection control rate was lower, 48% for the single setup compared to 75% for the dual setup ( $p = 0.43$ ). Multivariate regression analysis revealed that a single setup was a predictive variable for DAIR failure (OR 0.3, 0.08-0.93,  $p = 0.048$ )[13]. Mittal et al. reviewed dual surgical setups for two-stage arthroplasty and found a

significant reduction in complications when a sterile field was re-established before final implantation. Overall, a 29.9% recurrence of PJI was observed in the 134 patients reviewed. In the single setup group, 36.1% experienced a PJI recurrence, whereas only 6.9% in the dual setup group had a recurrence ( $P < 0.01$ ). [14] The steps proposed by Katakam et al. and Mittal et al. involved a double-drape setup with outer drapes removed at the interval period, and the dirty instruments, tables, gowns, and gloves were changed prior to the clean procedure. The barriers to widespread adoption include challenges related to increased time and workflow, cost considerations, and the need for surgical team training to establish procedural standardization.

### **Conclusion:**

The reviewed literature demonstrates increased contamination in the setting of septic revisions and increased duration during revision arthroplasty cases. This review also suggests that separate instrument setup and redraping may lead to a lower risk of bacterial contamination and possibly a decreased recurrence of infections. Additional research is needed to conclusively determine if redraping and new instrument setups are beneficial in single-stage arthroplasty in terms of recurrence rates. This practice can help standardize procedures across teams and reduce variability in outcomes. The cost-effectiveness, ease of introduction, and satisfaction of both the surgical team and patients should also be evaluated to further determine its success.

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