



# CORR Insights

## CORR Insights®: The Gown-glove Interface Is a Source of Contamination: A Comparative Study

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### Where Are We Now?

Total joint arthroplasty (TJA) infection causes severe morbidity that may result in

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mortality, and generates substantial costs both to the patient and the healthcare system. Early studies found that the use of negative-pressure body exhaust suits decreased the risk of deep infection following TJA [1, 4]. However, more-recent work has found an equal or higher infection rate with use of modern positive-pressure surgical helmet systems compared to conventional surgical gowns [2, 5]. It is not known why surgical helmet systems have not yielded similar decreases in infection rates as those reported with body exhaust suits. There are numerous challenges in answering this question among cases employing surgical helmet systems. These challenges include: (1) Conducting adequately powered studies of TJA infection, a rare event; and (2) using culture-positive TJA infection as a study endpoint as opposed to less-meaningful surrogates for infection.

### Where Do We Need To Go?

This current study examines the gown-glove interface as a potential source of

contamination with use of surgical helmet systems during TJA. It is theorized that positive pressure within the gown causes contaminated skin cells to escape through the unsealed gown-glove interface. Using 0.5 micron fluorescent powder as a surrogate for contaminated skin particles, the authors demonstrate that the gown-glove interface is a source of contamination in several types of surgical helmet systems equal to that of a conventional gown during simulated TJA. The study proposes that increased contamination at the gown-glove interface may occur with stiffer gowns, likely due to a further compromised gown-glove seal. While there may be sufficient evidence to propose a study examining a secure band placed at the glove cuff to seal the gown-glove interface, several unanswered questions remain. First, does contamination at the gown-glove interface result in TJA infection? Second, is there a difference in sterile technique surgeons employ with use of surgical helmet systems that may explain the higher infection rate observed in some studies as compared

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to traditional gowns? Third, do the findings of early studies demonstrating a lower infection rate with use of negative pressure body exhaust suits compared to traditional gowns hold true in the context of contemporary surgical protocols?

## How Do We Get There?

In order to determine if contamination at the gown-glove interface results in TJA infection, an adequately powered, prospective randomized controlled trial evaluating TJA infection rate of surgeons wearing a surgical helmet system with and without a secure band at the glove cuff should be conducted. However, a pilot study in which culture swabs are obtained of the gown-glove interface at the conclusion of TJA performed with and without a secure band at the glove cuff may be more practical. Multiple studies have demonstrated that surgical helmet systems should not be considered sterile, and a glove change should be performed following contact with the surgical helmet systems [3, 6]. However, surgeons may not

strictly adhere to this practice, which may explain the higher infection rates with surgical helmet systems observed in some studies. A study of this hypothesis may be performed by counting the number of contacts made with the surgical helmet system during TJA, which would not occur with use of a conventional gown. In studies conducted more than 30 years ago, use of body exhaust suits was found to decrease TJA infection rate. Since that time, factors with relevance to infection risk have changed, including emergence of resistant bacteria, increased obesity, advent of new immunosuppressive drugs, and shorter operative times. As a result, the presumed benefits of negative pressure body exhaust suits may be revisited in a registry study comparing TJA infection rate among surgeons wearing a modern, less cumbersome version of a body exhaust suits versus a conventional gown.

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