

Operating Room Airborne Microbial Load; Non-Scrubbed Staff Apparel Matters

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INTRODUCTION:

Periprosthetic joint infection is the leading cause of total joint replacement failure. One possible contributing factor is the airborne microbial load of the operating room. In a previous study, we found a statistical correlation between the level of contamination and the airborne particle concentration with the number of staff present in the OR. In the current study, we focused on the apparel of non-scrubbed OR staff to elucidate the contribution of different manners of dress to the airborne microbial load and the viable contaminate settle rate.

METHODS:

The aim of this study was to measure any differences in the contribution of viable particles to the airborne microbial load of a room while wearing approved and alternative OR garb. The garb of group 1 (approved) consisted of hospital laundered scrubs, hospital laundered jacket, disposable hair bonnet, disposable face mask, and disposable shoe covers. Group 2 donned disposable sterile cleanroom coveralls with zipper closure and elastic wrists and ankles over the scrubs and likewise wore a disposable hair bonnet, disposable face mask, and disposable shoe covers. For one hour, four lab members acting as group 1 conducted maneuvers in an OR that was not in use that imitated movements of the nurse, anesthesiologist, company rep, and entering/circulating/exiting staff. Passive agar plate sets were placed at the nurse's station, patient table, instrument table, and anesthesiologist's station to collect viable settling contaminants. Additionally, an active particle counter was placed on the instrument table within the simulated sterile field to measure the airborne particulate concentration during each session. After one hour, the staff exited the OR and donned the sterile cleanroom coveralls of group two. The simulation was repeated in the same OR on the same day by the same individuals. All measures for both phases were averaged and reported in units of colony forming units/m²/hour for the settle plates and particles/m³ for the airborne concentrations.

RESULTS:

During the testing of the scrubs group in the OR, 218.7 ±35 CFUs/m²/hr were captured verses 50.5 ±13 CFUs/m²/hr for the coverall group (p<0.01). The concentration of airborne particles collected by the particle counter in the OR for the scrub group was 4952.1 ±495 particles/m³ and 1065 ±53 particles /m³ for the coveralls (p<0.01). This was a 77% and 79% reduction for both measures respectively (Figure 1).

DISCUSSION AND CONCLUSION:

OR personnel are a primary contributor to the airborne microbial load. A significant reduction of potential contaminants was found in both methods of measure when comparing standard OR scrubs to cleanroom coveralls. These results suggest that changing the non-scrubbed OR staff's apparel may be a beneficial infection prevention strategy.

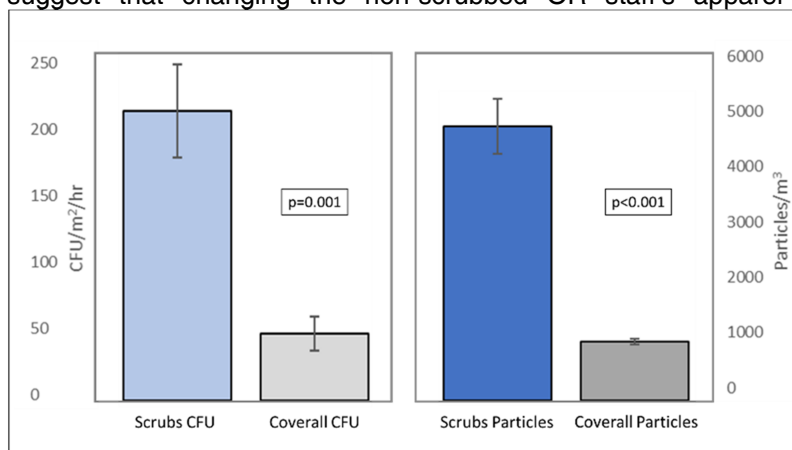


Figure1. Chart showing the viable particle settle rate inside the OR for each group (left) and the airborne particle concentration inside the OR for each test group (right).