

# THE EFFECTS OF A NOVEL DECONTAMINATION-RECIRCULATING SYSTEM IN REDUCING AIRBORNE PARTICULATE: A LABORATORY-BASED STUDY

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## Aim

The prevention of surgical-site infection (SSI) is of great importance. Airborne particulate correlates with microbial load and SSI. There are many potential sources of airborne particulates in theatre and from an experimental point of view impossible to control. We evaluated the effectiveness of a novel air decontamination-recirculation system (ADRS) in reducing airborne particles in a laboratory environment and controlled the introduction of particulate using diathermy.

## Methods

Airborne particles were measured with and without activation of the ADRS in PC2 laboratory to provide a baseline. Particles were generated in a controlled manner utilising electrocautery ablation of porcine skin tissue. Ablation was performed at 50W power (Cut) for 60 seconds at a constant rate with and without the ADRS operating in the PC2 laboratory. Particles were measured continuously in 30s intervals at two sites 0.5m and 3m from the site of diathermy. Adequate time was allowed for return to baseline between each repetition. Each experiment was repeated 10 times.

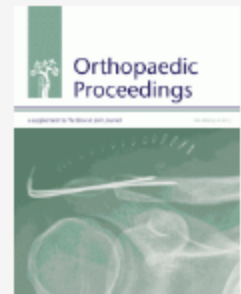
## Results

The ADRS significantly reduced baseline airborne particles in the empty PC2 laboratory. When using electrocauterization (as a source of particle generation), peak particles were significantly higher at 0.5m compared to 3m. Small particles (0.3–0.5 microns) were reduced at 0.5m with ADRS whilst larger particles were not. The ADRS significantly reduced all particles of 0.3–10.0 microns at 3m. Particles also returned to a lower baseline and at a faster rate with the ADRS.

## Conclusion

Airborne particle counts are a surrogate measure of microbial load. As likelihood of SSI is assumed to increase with the quantity of airborne pathogens present, there is a great deal of interest in methods of reducing airborne particle count in the operating theatre. Distance from the source of particle generation influences particle load and has potential clinical relevance for the operating theatre layout and staff. The ADRS effectively reduced the peaks and baseline of airborne particles and hastened the clearance of generated particles. The use of this technology in the operating theatre is of great interest for further research as suppression of airborne particulate may play a role in reducing SSIs. Diathermy provides a simple means to introduce particles in a controlled manner for such experiments.

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### Metrics

### History

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