

INTRODUCTION

Contact lens (CL) cases become contaminated with microbes during use [1,2]. Microbial contamination of CL cases may result in biofilm formation [3]. Bacteria within a biofilm are less susceptible to antimicrobials and multipurpose contact lens disinfection solutions [4]. The biofilm can then serve as a source of bacteria to contaminate contact lenses during storage [5]

AIM

To evaluate bacterial transmission from biofilms in contact lens storage cases to contact lenses during storage and disinfection.

METHODS

- A contact lens disinfection solution containing Povidone-Iodine (PI) (Cleadew, Ophtecs Corporation, Japan) was used.
- Biofilms of *Pseudomonas aeruginosa* 071 or *Staphylococcus aureus* 031 were grown in lens cases for 24 hours.
- Etafilcon A or senofilcon A contact lenses were placed in biofilm laden lens storage cases and either:
 1. Disinfected with solution for 4 hours, or
 2. Stored in rinsing solution for 4 hours, or
 3. Stored in saline solution for 4 hours.
- The number of bacteria in lens storage cases and contact lenses were then estimated by culture.

RESULTS

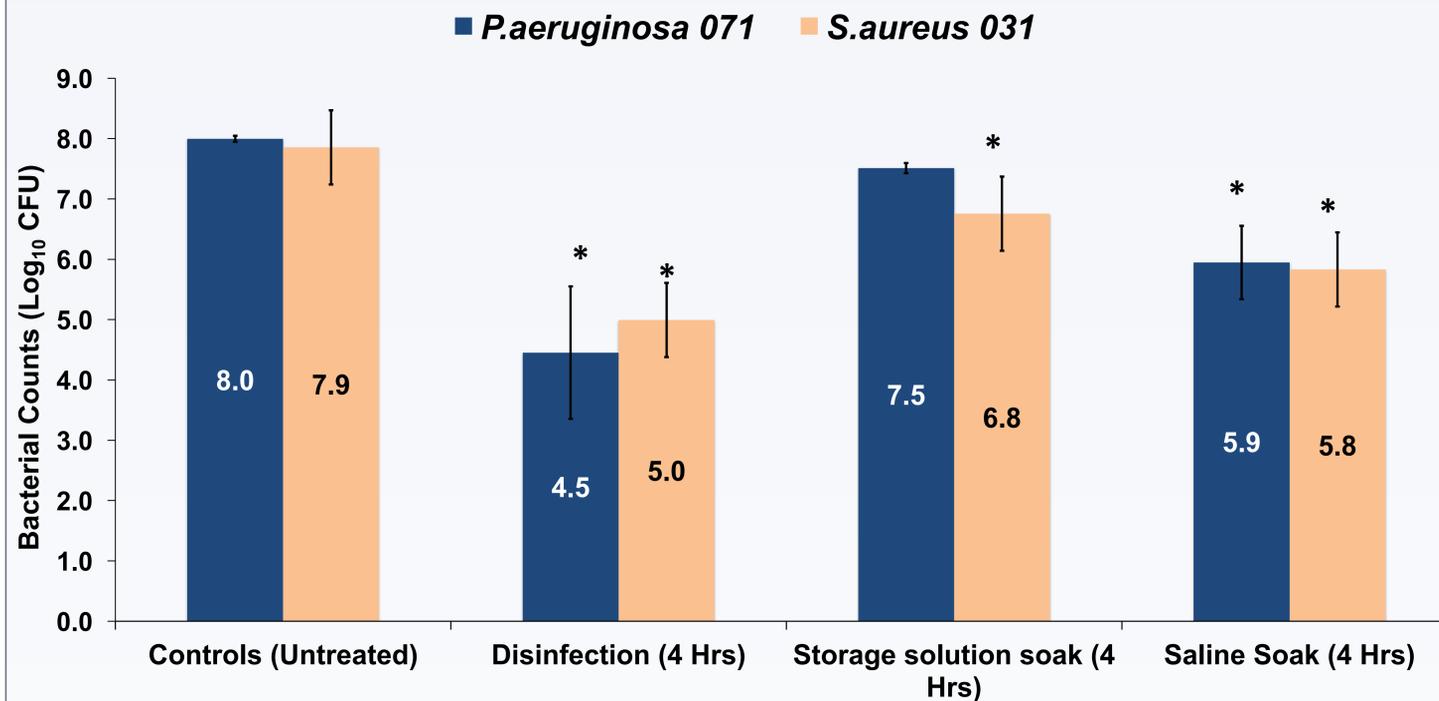


Figure 1: Number of bacteria (Mean ± 95% CI) isolated from contact lens storage cases. (* p<0.01, Compared to Untreated Cases)

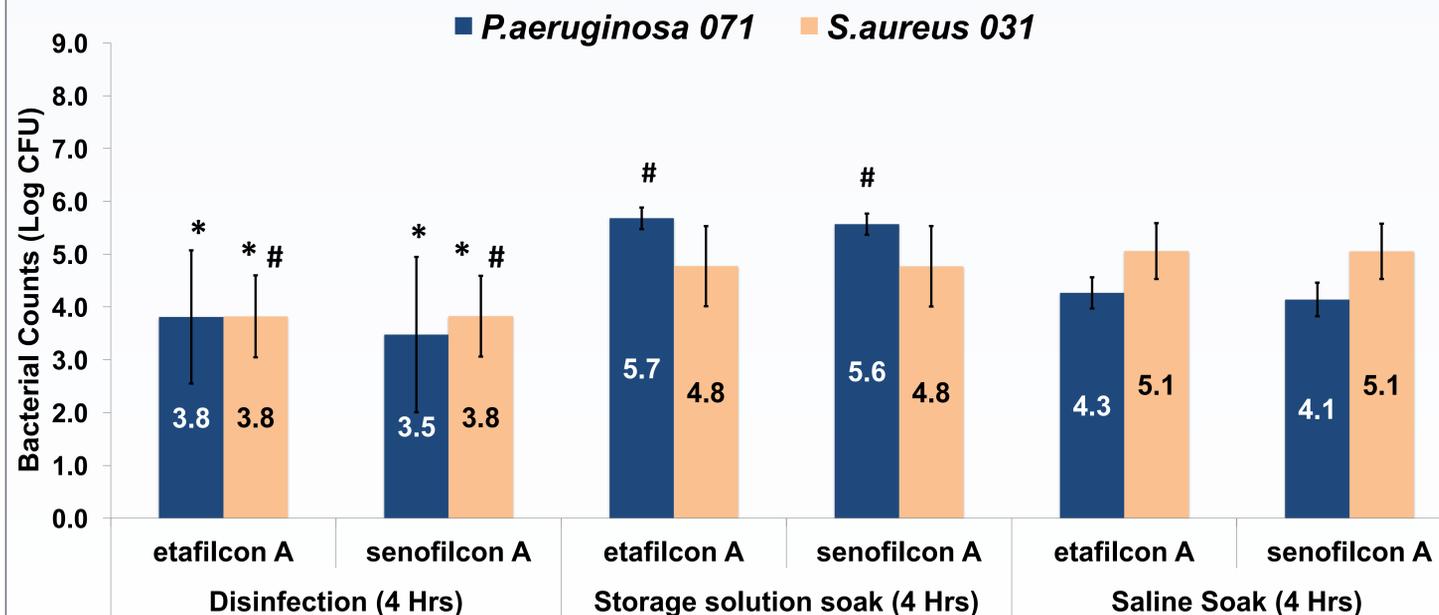


Figure 2: Comparison of bacterial transmission (Mean ± 95% CI) to etafilcon A and senofilcon A contact lenses from treated lens storage cases. (* p<0.01, compared to lenses in storage solution soaked cases; # p<0.01, compared to lenses in saline soaked cases)

RESULTS

- There was a significant reduction in *P.aeruginosa* (-3.5 log₁₀ CFU; p<0.01) and *S.aureus* (-2.9 log₁₀ CFU; p<0.01) biofilms following 4 hours disinfection with Cleadew (Figure 1).
- There was no difference in bacterial transmission to the 2 lens materials (Figure 2). 26% of *P. aeruginosa* and 13% of *S. aureus* were transferred to contact lenses from disinfected storage cases.
- Contact lenses from disinfected storage cases had significantly lower numbers of *P. aeruginosa* (-2.0 log₁₀ CFU, p<0.01) and *S. aureus* (-1.0 log₁₀ CFU, p<0.01) compared to lenses from storage cases filled with only rinsing solution.

CONCLUSION

Cleadew contact lens disinfecting solution containing povidone-iodine is very effective at reducing bacterial biofilm in lens cases. Bacterial transmission to contact lenses can also be reduced by proper disinfection of contact lens storage cases.

REFERENCES

1. Willcox, M. D., et al. (2010). *Optom Vis Sci* 87(7): 456-464.
2. Wu, Y.T., et al. (2010). *Optom Vis Sci*. 87(3): E152-E158.
3. McLaughlin-Borlace L, et al. *J Appl Microbiol* 1998;84:827-38.
4. Szczotka-Flynn LB, et al. *Cornea* 2009;28:918-26
5. Vermeltfoort PB, et al. (2008). *Journal of Biomedical Materials Research Part B, Applied Biomaterials*, 87(1):237-43.

ACKNOWLEDGEMENTS

The authors would like to thank the Ophtecs Corporation for providing the solutions and lens cases free of charge.