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Influence of Wear on Bacterial Adhesion and Disinfection to Silicone Hydrogel Contact Lenses

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Abstract

Purpose: The aim of this work was to determine the effect of wear in microbial cell adhesion to silicone-hydrogel contact lenses (CL) and in the performance of a multipurpose solution (MPS). Hydrophobicity was accessed to unworn and worn CL in order to evaluate the existence of surface changes induced by wear.

Methods: Worn and unworn CL were colonised by a clinical strain of *Staphylococcus epidermidis* through a dynamic adhesion assay performed in a parallel plate flow chamber. The same device was used to study the efficacy of the MPS (ReNu MultiPlus, Bausch & Lomb, Rochester, NY) in detaching adhered cells and the percentage of remaining dead cells was determined by propidium iodide staining. Lens surface hydrophobicity was determined through contact angle measurements using the advancing type technique in air. In this study were tested four silicone hydrogel CL (Galyfilcon A, Balafilcon A, Lotrafilcon A, Lotrafilcon B) and one conventional hydrogel (Etafilcon A).

Results: Worn silicone hydrogel CL were equally or less prone for microbial adhesion than unworn lenses, whereas worn conventional hydrogel CL exhibited a greater extent of microbial adhesion. This fact was related with changes in surface hydrophobicity of worn CL, probably due to the adsorption of tear film molecules. The MPS detachment capability from both unworn and worn CL was similar; however the percentage of dead cells after MPS's application was superior to worn CL.

Conclusions: Lens surface hydrophobicity is highly modified during wear and this fact influences microbial adhesion. The detachment capability of the MPS was similar to unworn and worn CL. However, worn lenses exhibited a superior amount of dead cells.

Key Words: Staphylococcus • contact lens • microscopy: light/fluorescence/immunohistochemistry