Will the Acuvue Lens Stand Up To Daily Cleaning?

Senior Research Project

by

Stacey Michaels

1990

The Acuvue disposable lens was first introduced in 1987. This new "disposable" contact lens was initially geared to be worn extended wear for two weeks and the disposed of. The frequent replacement of this lens was to prevent complications associated with extended wear lenses. Conventional hydrogel extended wear lenses have been associated with such complications as infectious and noninfectious corneal ulcers, corneal edema, peripheral neovacularization, and giant papillary conjunctivitis. The new Acuvue, with it's frequent replacement, was thought to be the end to all of these complications, however, recent publications have proven this untrue. Complications of the Acuvue worn on an extended wear basis have included noninfectious corneal ulcers, microbial keratitis, and infiltrative keratitis. Due to the complications of extended wear in general, in late 1989 the Food and Drug Administraion instituted new guidelines for extended wear lenses. The law stated that an extended wear les should never be worn continuously without removal for longer that one week. This legislation has posed questions as to the wearing schedule of the new Acuvue lens. Is this lens durable enough to be handled more than the initial insertion and removal? Can it withstand conventional hdrophilic contact lens cleaning regiments? The purpose of this experiment was to address the above question.

This experiment involved cleaning Acuvue disposable lenses on a daily basis for a period of four weeks. Each lens was inspected daily with a hand held magnifier, and weekly with a microscope for the effects of the cleaning regiment on them. Three groups of lenses and a control were used. Each group contained four lenses, for a total of sixteen lenses in the experiment. Below are the cleaning solutions used with each group.

Group 1	Renue Disinfectant	
Group 2	Opticlean	Optifree Disinfectant
Group 3	Miraflow	Aosept Disinfectant
Group 4	Heat disinfectant with Sensitive Eyes Saline	

The manufacturers directions were strictly adhered to with all cleaning regiments. Group one, the control lenses, were never cleaned. They were merely soaked in Renu disinfecting solution to prevent any contaminations of the lenses which could have occurred if the lenses were merely soaked in a saline solution. Group 2 and 3 lenses were cleaned and disinfected directly according to the manufacturer of the solution reccomendations. Group 4 was heat disinfected to determine the effects of increased temperature on the Acuvue lens. Each lens was inspected daily with a hand-held magnifier, and weekly with a microscope.

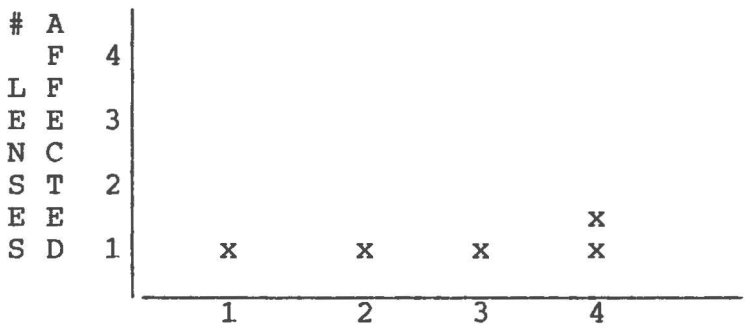
Results

The first adverse effects of the experiment were noticed after exactly two weeks. It was then when one small tear was noticed in a control lens, and also in a heat disinfected lens. By this finding we could conclude the mere daily handling for inspection of the control lenses caused damage to them. Also, the heat disinfected lens was damaged by it's cleaning regiment. Since it was not mechanically rubbed as were the Group 2 and 3 lenses, but merely disinfected each day, it was evident that either the increased temperature or the daily handling caused these adverse effects.

The next effects were noted after eighteen days of cleaning. At this time a small nick was seen in one lens of both group three and group four. At twenty-three days another tear was discovered in a heat disinfected lens.

At the completion of the study, five out of sixteen, or thirty-one percent of the lenses had shown some type of adverse effect from the cleaning regiments, or the daily handling of them.

Of the four separate groups, the heat disinfection had the most detrimental effects on the lenses, with two out of four lenses showing damage to them. The other three regiments each had one out of four lenses damaged. Below is a graph showing the results.



Although, thirty-one percent of the lenses were in some way damaged we felt it neccesary to see if some of these microscopic faults could be noticed by an experienced contact lens wearer. Each damaged Acuvue lens was compared with a new Acuvue lens on an experimental subject. The subject was told to evaluate the comfort of each lens and state if any differences between the two lenses could be noticed. The results of this demonstrated two lenses to be undectable from a new lens. Therefore, of the five lenses in which effects were noted, three of them, or eighteen percent of the total number of lenses cleaned showed wear from the daily cleaning regiment. Based on this study, it can be stated that there is a less that one-in -four probability that an Acuvue lens will show adverse effects if cleaned and handled on a

daily wear basis for four weeks. However, if this time span is shortened to ten days, the probability that a lens will be effected is minimal..

What type of wearing/cleaning schedule is tis lens capable of? When considering the new FDA guidelines, and the results of this study I would recommend some type of flexible wear schedule. Cleaning the lenses on an every-other day basis, or on a daily wear basis should not show any noticable effects if only carried out for up to ten days. The effects of this type of wearing schedule on the patient have yet to be studied, however, it is my own personal bias that such a wearing schuedule will have less complications than have been reported with the use of these lenses on an extended wear basis.

References:

1. Parker, W. T.: Keratitis associated with disposable soft contact lenses. American Journal of Ophthalmology, 1989 Feb 15; 107(2): 195
2. Killingsworth, D. W.: Pseudomonas Keratitis Associated with the Use of Disposable Soft Lenses. Archives of Ophthalmology,1989 June: 107(6): 795-6
3. Serdahl, C. L.: Infilrative keratitis associated with disposable soft contact lenses. Archives of Ophthmalogy, 1989 March; 107(3): 322-3
4. Donshik, P.: Disposable hydrogel lenses for extended wear. CLAO-J 1988 Oct-Dec; 14(4): 191-4
5. Dunn, J. P.: Corneal ulcers associated with disposable hydrogel lenses. American Journal of Ophthmalogy. 1989 Aug 15: 108(2): 113-7
6. Kent, H. D.: Pseudomonas corneal ulcer associated with disposable soft contact lenses. CLAO-J. 1989 Oct-Dec: 15(4): 264-5