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A comparison of Optisoap versus commercial soap in preventing protein deposition on hydrophilic contact lenses

Abstract

This study compared the effectiveness of Optisoap versus other commercial hand soaps in preventing protein deposition of hydrophilic contact lenses due to soap residues. Twelve clean lenses were halved, treated with Optisoap or a commercial soap, and placed in a protein solution. The lenses were inspected for protein deposits after thirty and sixty minutes. No significant difference was found between the Optisoap or the commercial soaps.

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**A COMPARISON OF OPTISOAP VERSUS COMMERCIAL
SOAP IN PREVENTING PROTEIN DEPOSITION
ON HYDROPHILIC CONTACT LENSES**

**A Thesis Presented
to the Faculty of
Pacific University**

**In Partial Fulfillment of
the Requirements for the
Degree Doctor of Optometry**

Submitted by :

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Advisor :

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April, 1987

ABSTRACT

This study compared the effectiveness of Optisoap[®] versus other commercial hand soaps in preventing protein deposition of hydrophilic contact lenses due to soap residues. Twelve clean lenses were halved, treated with Optisoap[®] or a commercial soap, and placed in a protein solution. The lenses were inspected for protein deposits after thirty and sixty minutes. No significant difference was found between the Optisoap[®] or the commercial soaps.

KEY WORDS : Hand Soap, Hydrophilic Contact Lenses,
Lysozyme, Protein Deposits

INTRODUCTION

The development of protein deposits on hydrogel lenses may be an unavoidable consequence of lens wear. No matter how well patients follow care instructions, most soft lenses eventually lose their new appearance (2) become yellow or brown and appear dirty. It is important that contact lens patients have clean hands before they handle their lenses. Due to surface properties, soft lenses are able to absorb residues from soap preparations themselves. (2) A hand soap recommended for contact lens care should have the following characteristics : 1) very water soluble, 2) good lathering ability, 3) contain no fragrances or oil additives, (3) 4) contain an anti-microbial agent. Optikem International, Inc. has formulated a hand soap especially for contact lens wearers. Optisoap completely removes soils from hands and leaves no residues from the cleaner (2)(3) itself according to a clinical analysis.

This study was designed to determine if Optisoap is superior to commercial brands in its effectiveness in preventing protein deposits on contact lenses due to soap residues. Karageozian and co-workers identified (4) the proteinaceous material adhering to the lens as lysozyme. In-vivo evidence and amino acid analysis support the use of artificially induced protein deposits as a highly effective and reproducible technique for produc-

(4)
ing deposits which are chemically identical to in-vitro deposits. The
lenses were artificially coated with lysozyme after being placed in a
soap solution.

METHODS

(a)

Twelve clean, unworn, low water content contact lenses (consisting of non-ionic polymers) were halved. Each half was individually placed in ten grams of a 7% soap solution (Optisoap[®], Softsoap[®], or Clean Hands[®]) or distilled water for sixty minutes. The lenses were then removed from the soap solution, rinsed, and examined for deposits thirty and sixty minutes after being placed in ten grams of a .25% lysozyme solution.

The deposits were graded according to a modified version of the method⁽⁵⁾ described by Rudko and Proby. In this procedure the lenses were rinsed with distilled water, held with forceps against a dark background, and examined under 15X magnification with a slit lamp. The lenses were photographed for documentation and classified as follows :

- *Type 1 - clean, no visible deposits
- *Type 2 - deposits visible under 15X magnification
- *Type 4 - deposits visible without magnification

*The method described includes a Type 3 classification in which the lenses are blotted dry and examined without magnification. The process of drying the lens produces artifacts such as lathe cut marks that can be mistaken for deposits. Allergan no longer uses the Type 3 classification because of its questionable clinical importance.

The Following Contact Lenses were used in this study due to availability as student comp lenses.

CibaSoft - Tefilcon (38 %)

American Hydron Toric - Polymacon (38 %)

Aquaflex (Cooper) - Tetrafilcon A (43 %)

Optima 38 (B & L) - Polymacon (38 %)

(a)--High water content lenses were not used due to breakdown of the lens matrix when exposed to solutions used in this study.

RESULTS

After 30 minutes of soaking in the Optisoap[®] solution, 93% (14/15) of the lenses had deposits which were visible without magnification, compared to 92% (12/13) of the lenses treated with Softsoap[®] or Clean Hands[®].

All of the lenses (11/11) treated with distilled water before soaking in the lysozyme solution had deposits visible only under magnification or no deposits at all. One lens from the Optisoap[®] treatment had no visible deposits after 30 minutes and deposits visible only under magnification after 60 minutes. Another lens from the Softsoap treatment had only visible deposits with magnification after 30 and 60 minutes.

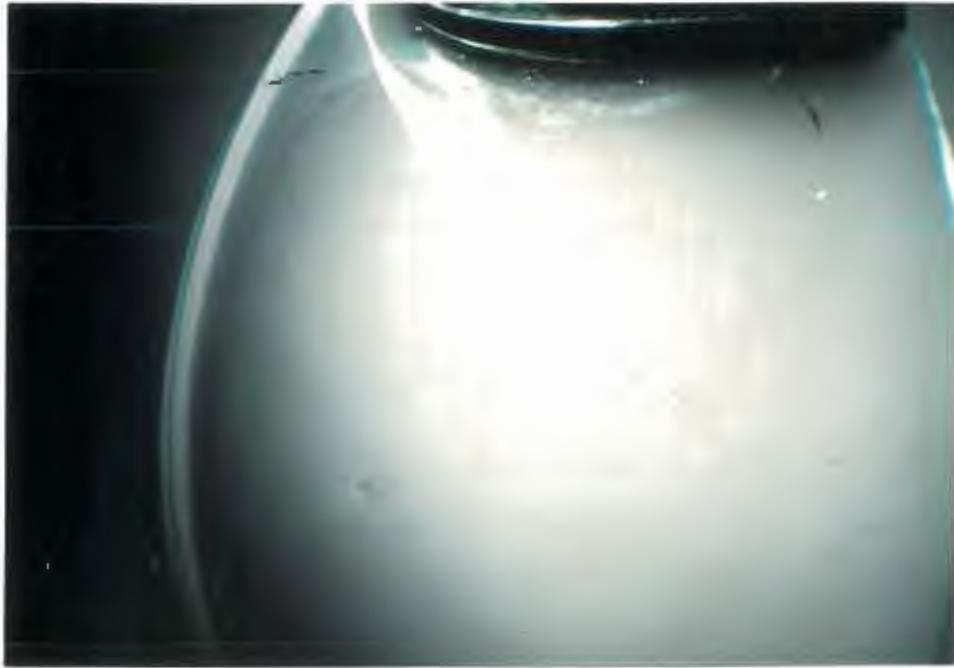


Figure 1 - Type 1 deposits after treated with distilled water and soaked in lysozyme for 60 min.



Figure 2 - Type 2 deposits after treated with distilled water and soaked in lysozyme for 30 min.

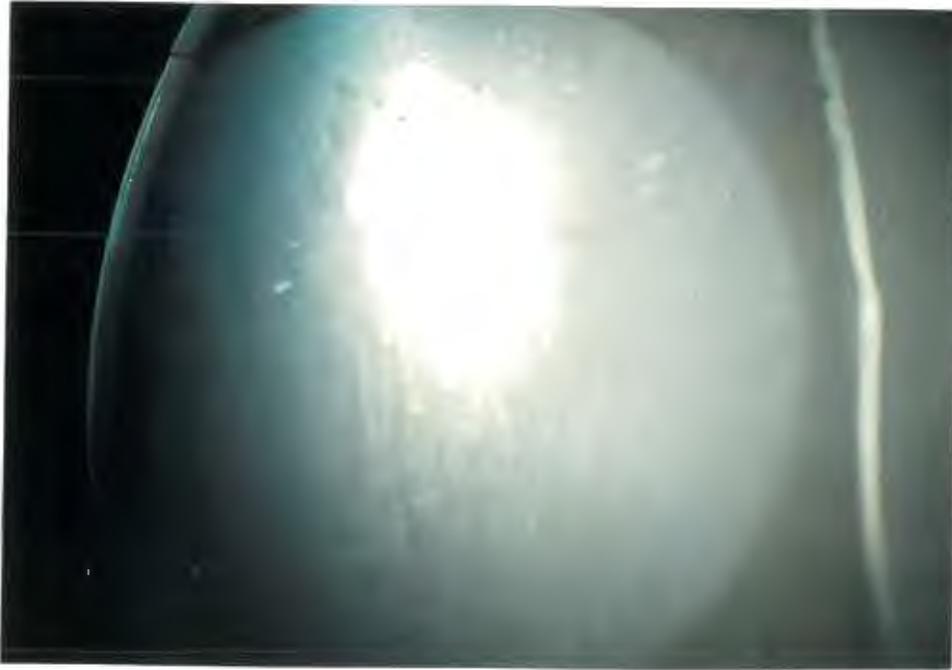


Figure 3 - Type 4 deposits after treated with Optisoap[®] and soaked in lysozyme for 30 min.



Figure 4 - Type 4 deposits after treated with Softsoap[®] and soaked in lysozyme for 30 min.

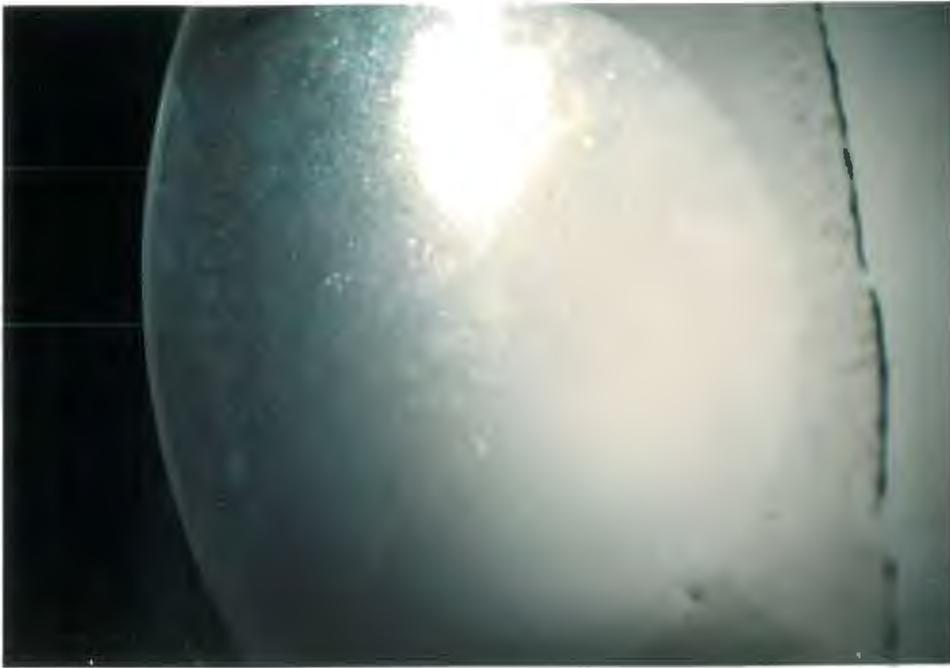


Figure 5 - Type 4 deposits after treated with Clean Hands[®] and soaked in lysozyme for 30 min.



Figure 6 - Lens from Optisoap[®] treatment with type 1 deposits after 30 min.



Figure 7 - Same lens in figure 6 after 60 min. with type 2 deposits.



Figure 8 - Lens from Softsoap[®] Treatment with type 2 deposits after 60 min.

**TABLE 1 : EFFECT SOAP PROTEIN DEPOSITION
ON HYDROPHILIC CONTACT LENSES
DUE TO SOAP RESIDUES**

<u>Product</u>	<u>Type 1</u> <u>30 min.</u>	<u>Type 2</u> <u>30 min.</u>	<u>Type 4</u> <u>30 min.</u>	<u>Type 1</u> <u>60 min.</u>	<u>Type 2</u> <u>60 min.</u>	<u>Type 4</u> <u>60 min.</u>
<u>Optisoap[®]</u>	1/15 = 7 %	0/15 = 0 %	14/15 = 93 %	0/15 = 0 %	1/15 = 7 %	14/15 = 93 %
<u>Softsoap[®]</u>	0/8 = 0 %	1/8 = 12.5 %	7/8 = 87.5 %	0/8 = 0 %	1/8 = 12.5 %	7/8 = 87.5 %
<u>Clean Hands[®]</u>	0/5 = 0 %	0/5 = 0 %	5/5 = 100 %	0/5 = 0 %	0/5 = 0 %	5/5 = 100 %
<u>Distilled</u> <u>Water</u>	2/11 = 18 %	9/11 = 82 %	0/11 = 0 %	2/11 = 0 %	9/11 = 18 %	0/11 = 0 %

DISCUSSION

Following the parameters of this study, Optisoap[®] was not shown to be superior to commercial soap in preventing protein deposits on hydrophilic lenses due to soap residues. However, the need for clean hands as part of an effective lens care regimen is important. Certainly patients should wash their hands with soap to clean their hands of tobacco, dermatological medications, body oils, and a host of other materials. Patients must rinse their hands well to remove any soap residues that may adhere to the lens, which when not removed, may act to attract protein to the contact lens surface.

CONCLUSION

The results of this study indicates no difference between Optisoap[®] versus the commercial soaps in preventing deposits on hydrophilic contact lenses due to soap residues.

Photographs of the deposits on the contact lenses used in this study are on file with the Contact Lens Department at Pacific University, Forest Grove, Oregon.

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