

David J. Apple, MD Laboratories for
Research on Ophthalmic Devices
Salt Lake City, Utah



THE GOOD, THE BAD, AND THE UGLY

Clint Eastwood

HYDROPHILIC ACRYLIC

HYDROPHOBIC ACRYLIC

Incidence of Posterior Capsulotomy with Nd:YAG

1988- 2002

Lens	Total	Nd:YAG	YAG %
3 PC Acrylic-PMMA (AcrySof)	488	20	4.1%
3 PC Silicone-PMMA	162	20	12.3%
1 PC Silicone Plate, Large Hole	124	26	20.9%
1 PC Silicone Plate, Small Hole	162	37	22.8%
3 PC Silicone-Prolene	417	97	23.2%
3 PC Silicone-Polyimide	99	24	24.2%
3 PC All-PMMA (Rigid)	3804	1166	30.6%
1 PC All-PMMA (Rigid)	2390	752	31.5%
All Lenses since 1/88	7646	2143	28.0%
Foldable lenses	1452	224	15.4%
Rigid Lenses	6194	1918	30.9%
1 PC Acrylic (AcrySof)	5	0	0.0%

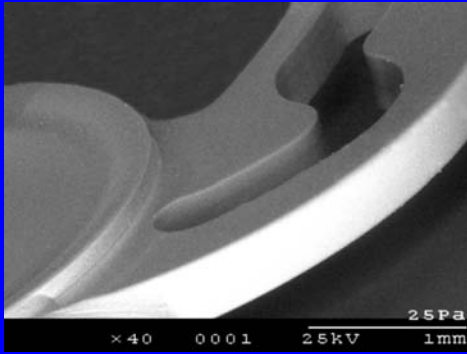
Vargas, Schmidbauer, Apple



FDA Study, 2006--YAG Rates(2 Years)

Before 2003 15%

After 2003 5%



D. Apple, Salt Lake

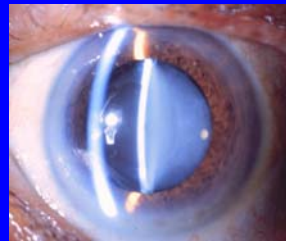
Is there a role for hydrophilic acrylic materials for IOLs?

YES!! **MODERN** well-designed, well-manufactured and well-implanted hydrophilic acrylic IOLs are safe and indeed can be desirable in certain clinical situations. But, what about calcification?

Classification of IOL Calcification

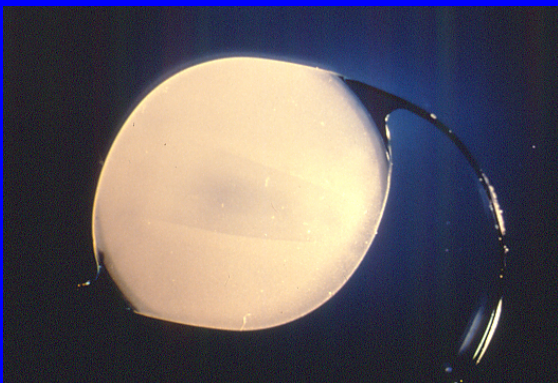
1. Primary
2. Secondary

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Hydrogel (Hydrophilic acrylic) Opacifications: Partial Listing of Manufacturers:

- Bausch and Lomb (B and L)
 - Cibavision
 - Medical Developmental Research (MDR)
 - Ophthalmic Innovations International (OII)
 - International Ophthalmic Devices (IOD)
 - Mediphakos
- and multiple sub-distributors



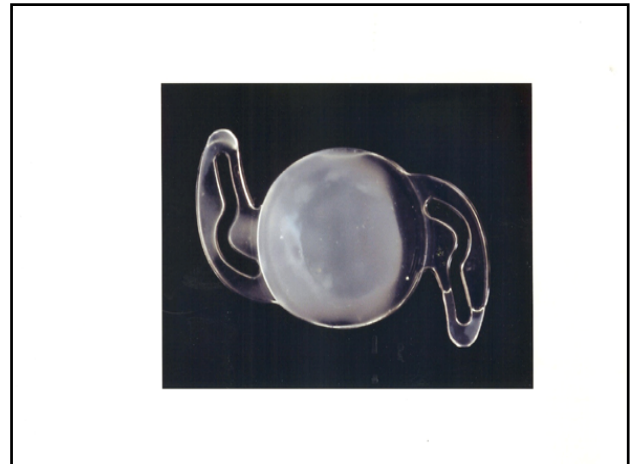
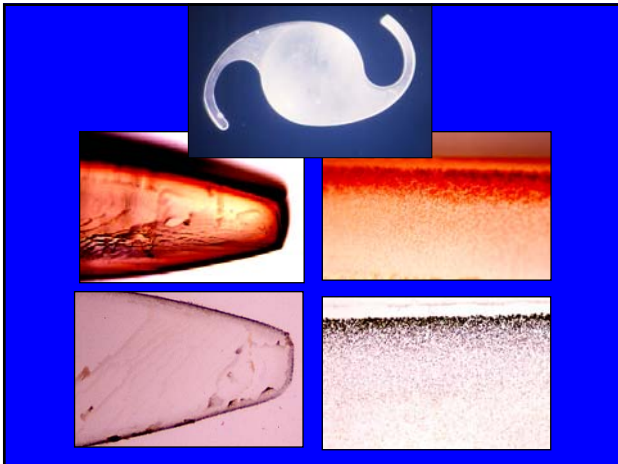
"Modern" Hydrophilic IOLs

- Rayner C-Flex
- B&L Akreos Series
- Others

Classification of IOL Calcification

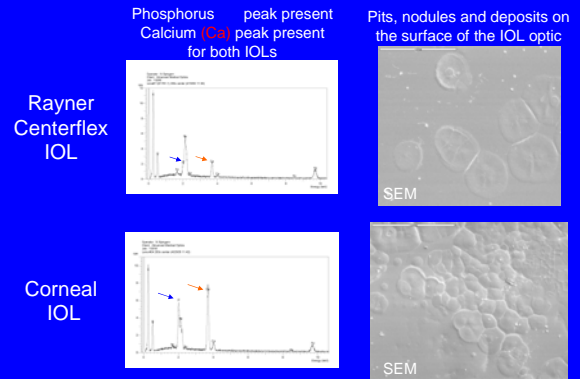
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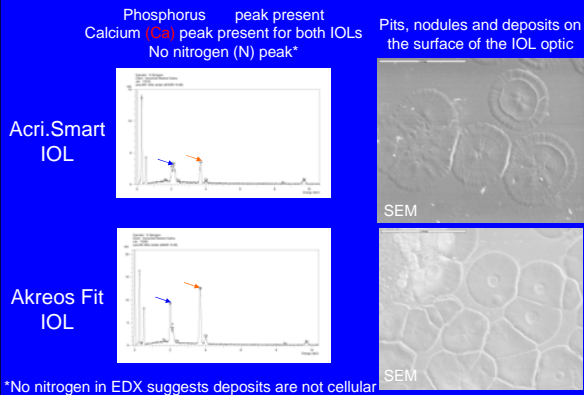


Comparison of Calcification of Three Intraocular Lens Materials, Hydrophilic and Hydrophobic Acrylic, and Silicone

Hydrophilic Acrylic IOLs



Hydrophilic Acrylic IOLs



Classification of IOL Calcification

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Is there a role for hydrophilic acrylic materials for IOLs?

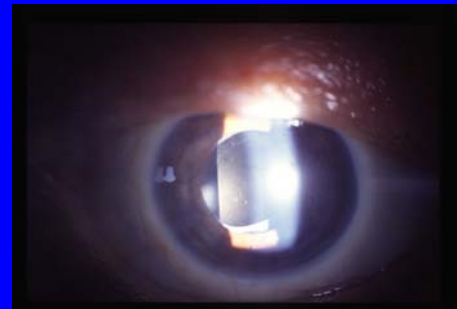
YES!! **MODERN** well-designed, well-manufactured and well-implanted hydrophilic acrylic IOLs are safe and indeed can be desirable in certain clinical situations. However one must be aware of situations conducive to **secondary** calcifications, eg. TASS.

Vacuoles ("Glistenings") in Hydrophobic Acrylic IOLs. An Under-reported Event.

Apple, D. and Nichamin, L., 1994
20/40 Vision



Apple, D., 2007
20/40 Vision



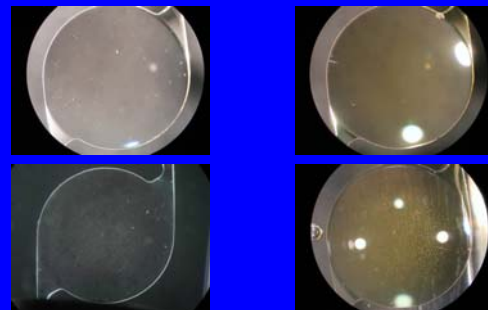
Method For Producing Hydrophobic Acrylic Vacuoles

- Lenses taken from package and placed in water
 - 36°C for 48 hours
 - 25°C for 24 hours, then checked in water (vacuoles may fade in air)

Oshika Tetsuro, et al. Influence of glistenings on the optical quality of acrylic foldable intraocular lens. Br J Ophthalmol 2001; 85:1034-1037.

Acrysof Material

IN WATER



AFTER INCUBATION

Sensar Material

IN AIR

IN WATER

AFTER INCUBATION

