



RESULTS OF PCO PREVENTION BY ULTRASOUND CAPSULE POLISHING AFTER 2 YEARS

Purpose of this study:

To demonstrate significantly clearer capsular bags by Slit lamp photography of showing the preventive effect on PCO proliferation after 2 years follow up using a new blunt ultrasound polisher.

Prof Keiki R. Mehta
Dr Cyres K. Mehta

Mehta International Eye Institute
Breach Candy Hospital & Research Center
D Y Patil Medical College & Hospital
Mumbai India



**WE HAVE NO FINANCIAL INTEREST
WITH THIS DEVICE**

METHODS USED IN THIS STUDY

Methods:

- ✘ To polish the capsular bag and remove lens epithelial cells (LEC) we used the Ultrasound polisher of a modified dental ultrasound device, EMS (Electro Medical Systems) Mini Piezon.
- ✘ The device can be applied directly to the LECs with a hand piece inserted into the capsular bag immediately following the cortical removal and just prior IOL insertion. Starting at the rhexis edge we removed LECs at the anterior capsular bag down to the fornix.
- ✘ Photographs of the capsules were done periodically by slit lamp photography. Cases were selected in different age groups from young (25-45 yrs) to older adults (50+).



The tips, straight and curved, both go through a 2.8 mm phaco incision

HOW THE STUDY WAS DONE :: THE DEVICE

How the study was done

- ❑ 140 bilateral cases of cataracts were assigned randomly to received manual polishing following standard phaco cataract surgery in one eye, for 3 minutes by the clock V/s the other being polished with the new ultrasound polisher again for the same period.
- ❑ All cases were done within a month of each other.
- ❑ Both had identical implants, Acrysof IQ or Rayner Hema Acrylate, or AO soft IOL's.
- ❑ Since well polished capsules do not easily opacify , a new technique of reflection grating to assess the difference was developed

The Device

- ❑ EMS (Electro Medical Systems) Mini Piezon the piezo-ceramic Dental device
- ❑ With its 32,000 movements per second, delivers oscillating action that is uniformly aligned
- ❑ Electronics with automatic frequency tuning and power control
- ❑ Instruments optimum hygiene with fully autoclavable handpiece

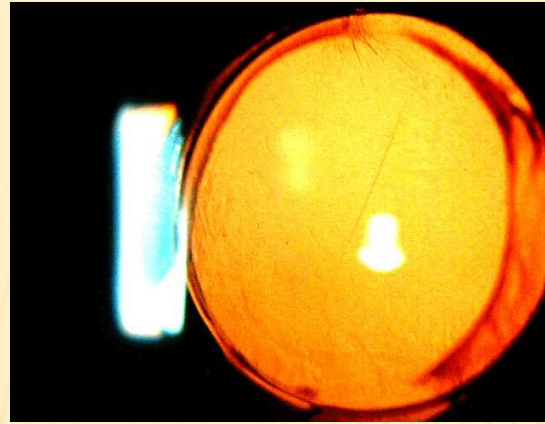
Criteria Of Grading Based On Grating Analysis

- ✘ Grade 0 virtually clear.. No excrescences or irregularities on the surface.
- ✘ Grade 1: Small surface irregularities . Small dimples visible.
- ✘ Grade 2: Capsular thickening easily visible, gross surface irregularities.
- ✘ Grade 3: Medium capsular thickening.
- ✘ Grade 4: Thick capsular thickening.

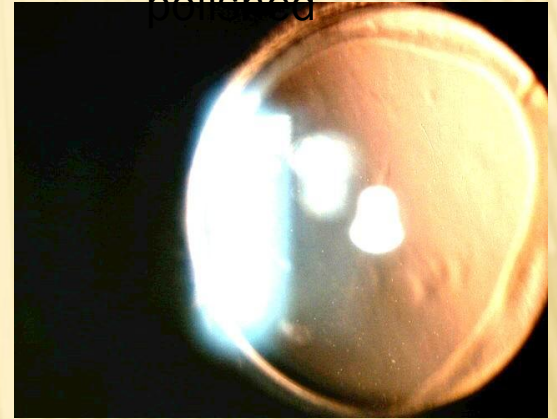
Polishing Manual / Ultrasound Posterior Capsule Video

Typical pictures

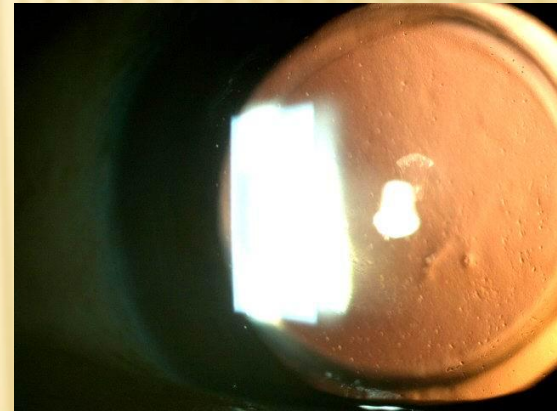
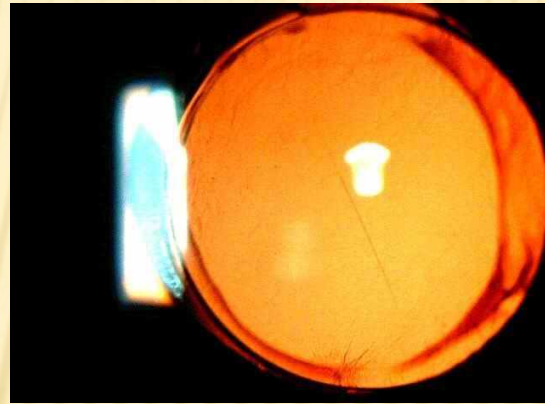
6 months foll surgery



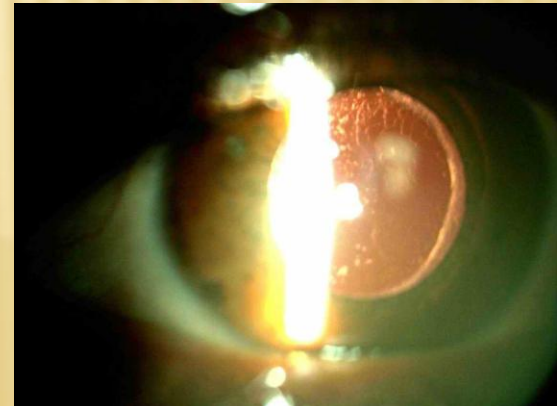
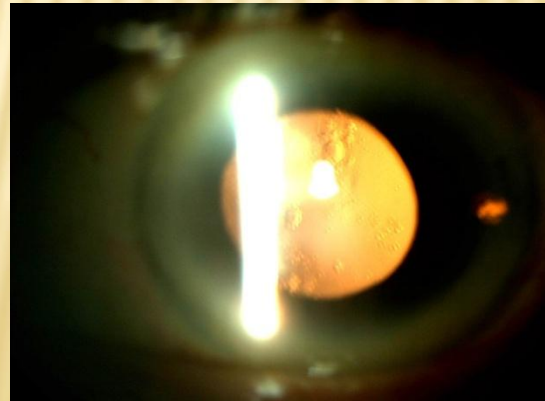
Ultrasound polished



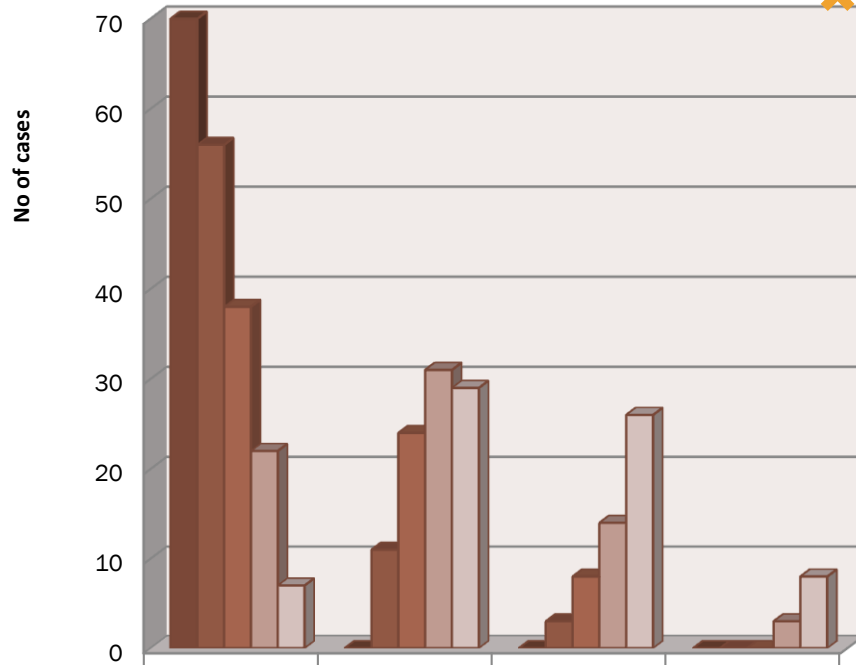
1 year foll surgery



2 years foll surgery

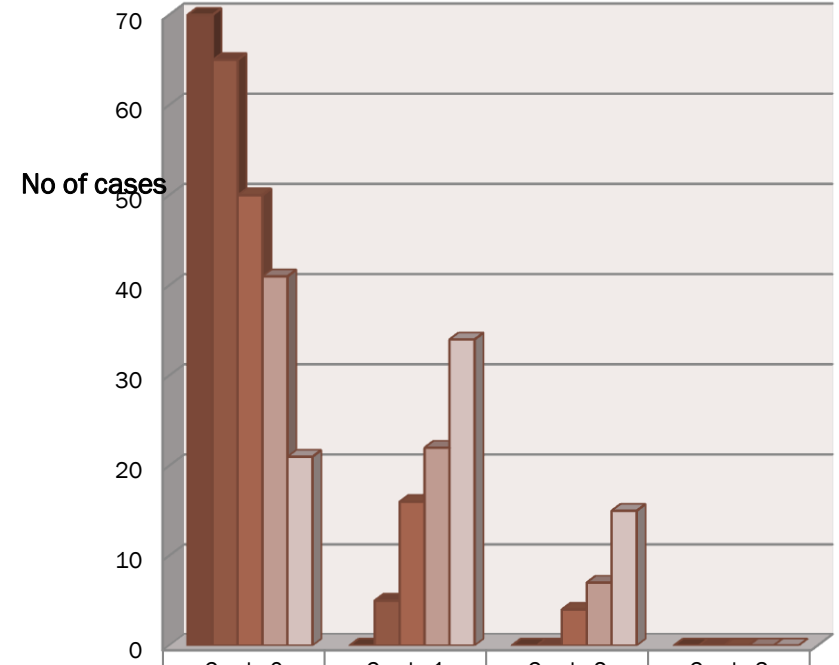


Capsular Thickening Using Manual Polishing Technique



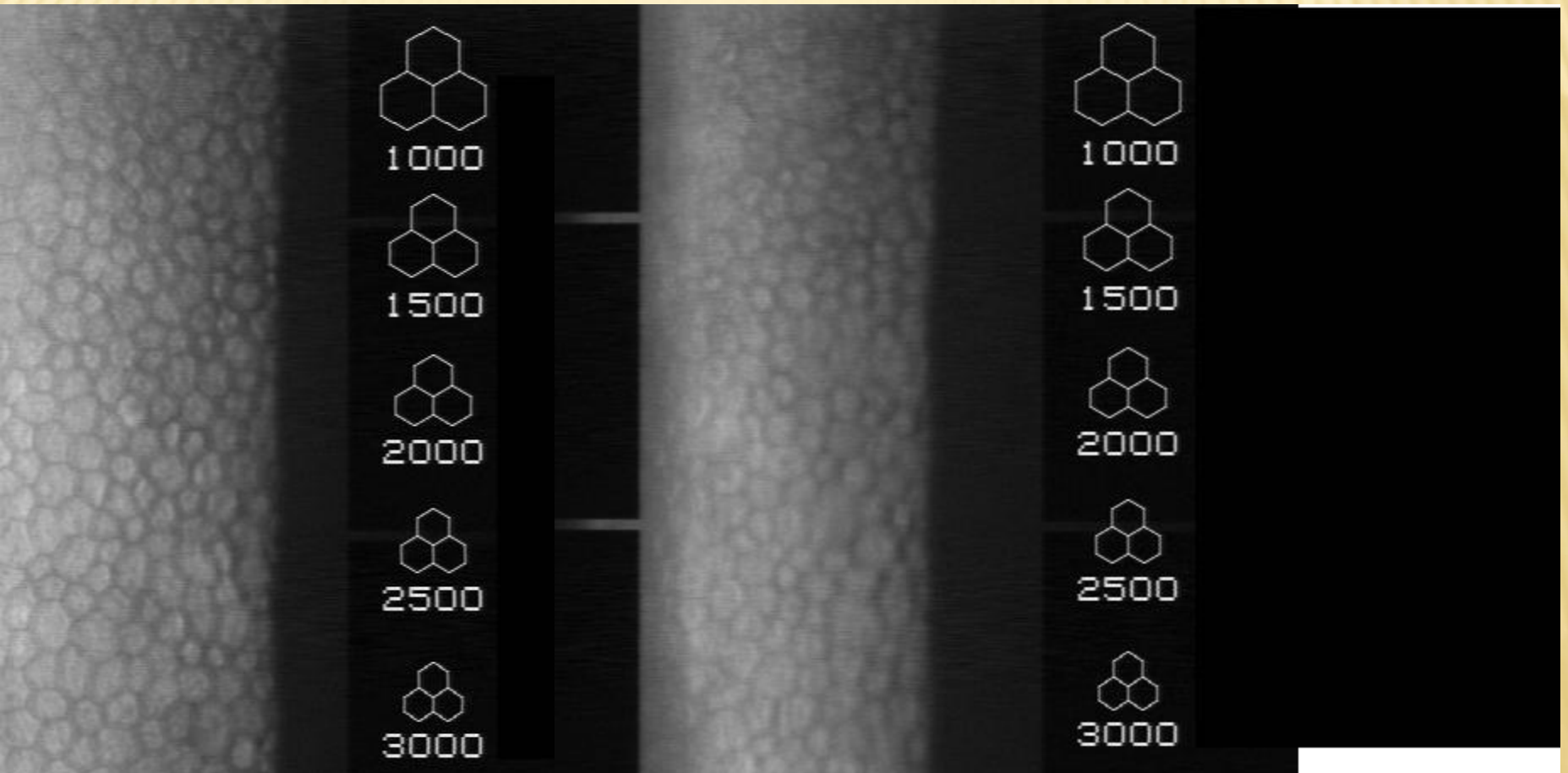
| | Grade 0 | Grade 1 | Grade 2 | Grade 3 |
|-----------|---------|---------|---------|---------|
| 1 month | 70 | 0 | 0 | 0 |
| 6 months | 56 | 11 | 3 | 0 |
| 12 months | 38 | 24 | 8 | 0 |
| 18 months | 22 | 31 | 14 | 3 |
| 24 months | 7 | 29 | 26 | 8 |

Capsular Thickening Using Ultrasound Polishing technique

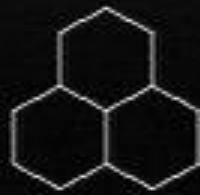


| | Grade 0 | Grade 1 | Grade 2 | Grade 3 |
|-----------|---------|---------|---------|---------|
| 1 month | 70 | 0 | 0 | 0 |
| 6 months | 65 | 5 | 0 | 0 |
| 12 months | 50 | 16 | 4 | 0 |
| 18 months | 41 | 22 | 7 | 0 |
| 24 months | 21 | 34 | 15 | 0 |

ENDO EVALUATION PRE AND POST OP PHACO WITH U/S POLISHING.



Endothelial Cells Analysis with the
Topcon Non Contact Specular Microscope SP-2000P



1000



1500



2000



2500



3000

**U/S POLISHING
EXPOSURE 30
SECONDS**

IN CONCLUSION

- × **Mode of Function** The ultrasound action, strips all the cortical material and cells from the capsule by ultrasound stripping away the majority of equatorial epithelial cells, it reduces posterior capsular opacification
- × **Results** The concept of Ultrasound polisher works well, with 78% of capsules being clearer, for longer, than their manually polished counterparts, irrespective of the type of IOL used.
- × **Conclusion:**
Removing LECs by an ultrasound polisher has a preventive effect on PCO formation. This cleaning method is very effective in contrast to pure mechanical cleaning procedures, which did not cause satisfying results in the past.
- × **Long term application of this study**
With the increasing interest in the potential for a pseudo accommodative IOL, Ultrasound polished capsules are clearer, keeping accommodative lenses functioning better, for longer.