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SCANNING ELECTRON MICROSCOPE: IS IT USEFUL FOR ANALYZING OPACIFIED IOLs ?

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PURPOSE: To investigate the actual role of Scanning Electron Microscopy (SEM) for analyzing causes of the opacification of hydrophilic intraocular lens (IOL). MATHERIAL & METHODS:Lenses were fixed in 2.5% glutaraldehyde, 0.07 M sodium cocodylate buffer(1), pH 7.2, at room temperature for 5 days with daily changes of fresh fixative. After an overnight buffer fresh, lenses were split along their polar axis to reveal fiber organization and osmicated overnight in 15 aqueous OsO4 – osmiun tetroxide 1% and tannic acid 1%. After an additional overnight buffer wash, the material water was removed by dehydration through a graded series of ethanol to ethanol – 50%, 70% and 90%. Ethanol was then replaced to 100% Freon 113. Lens pieces were critical point dried in Freon 113 in Balzers CPD 020. Critical point dried pieces were secured onto aluminium stubs with conductive silver paint. Specimens were mounted on their convex surfaces so that could be studied at 90° to the direction of the electron beam. All specimens were sputter coated with gold in vacuum, then examined in a Jeol 35 Scanning Electron Microscope at 15 Kv. Micrographs were taken with Polaroid Camera System(2) It was observed on preparation to SEM that lens expanded twice their size when were immersed in ethanol 70%. After critical point drying, the lens returned to it's original size. RESULTS : The three-dimensional appearance of the explanted IOL surface was well illustrated by SEM (3). The anterior and posterior surfaces and haptics were irregular and had a "cerebriform aspect" with convolutes of elevated areas alternating with crevices. The control group of IOLs showed smooth surface. DISCUSSION : Calcium, phosphorus and oxygen on the lens surface were suggested by some authors as being involved with opacification process. A "cerebriform appearence" found is similar to literature, nevertheless, on the preparation to SEM, it was observed that lens expand and recover their original size. We suggest that the size changes of the lens take a role on the development of "cerebriform appearence" of chemical deposits.