## Phaco considerations in the Pseudoexfoliation eye



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## Disclosure

础 No financial interest

Pseudoexfoliation in a Rural Population of Southern India: The Aravind Comprehensive Eye Survey

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- Prevalence (over 50 years) 6%
  - Increased with age
  - Greater in males
- 7.5% had glaucoma
- 25.7% bilaterally blind
  - 89.3% of these are blind from cataracts

### In-the-Bag Capsular Tension Ring and Intraocular Lens Subluxation or Dislocation

A Series of 23 Cases

Liliana Werner, MD, PhD,<sup>1,2</sup> Brian Zaugg, BS,<sup>1</sup> Tobias Neuhann, MD,<sup>3</sup> Michael Burrow,<sup>1</sup> Manfred Tetz, MD<sup>2</sup>

 23 Explanted eyes
17 (74%) Pseudoexfoliation
IOL type
11 3-piece hydrophobic acrylic
6 1-piece hydrophobic acrylic

#### Ophthalmology 2012;119:266-271



## Intraoperative Complications

Author	Year	Country	Туре	PEX (n)	Control (n)	ZD rates	PCR rates	VL rates
Dosso	1997	Switzerl and	Prospective	20	20	No	NA	NA
Scorolli	1998	Italy	Retrospective	195	1052	Yes	Yes	Yes
Drolsum	1998	Norway	Retrospective	178	974	Yes	Yes	No
Shingleton	2003	USA	Retrospective	297	427	Yes	No	No
Nagashima	2004	USA	Prospective	67	1670	No	No	No
Hyams	2005	Israel	Retrospective	137	1364	No	No	No
Akinci	2008	Turkey	Retrospective	800	1600	No	No	No
Romero- Aroca	2010	Spain	Prospective	143	655	Yes	Yes	NA

### Aravind Pseudoexfoliation (APEX) Study



Tirunelveli (1988)

### Randomization

PEX Group- Total 930 eyes



MA60AC Three Piece Acrylic

### Randomization

Control Group- 2 groups- 250 each- Total 476 eyes



SA60AT Single Piece Acrylic

MA60AC Three Piece Acrylic

AMERICAN ACADEMY OF OPHTHALMOLOGY

#### The Aravind Pseudoexfoliation Study

#### Surgical and First-Year Postoperative Results in Eyes without Phacodonesis and Nonmiotic Pupils

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*Purpose:* To compare intraoperative complication rates, 1-year visual outcomes, and postoperative complication rates over the first postoperative year in eyes with and without pseudoexfoliation undergoing cataract surgery.

Design: Prospective, comparative, interventional study.

*Participants:* Nine hundred thirty eyes with cataract and uncomplicated pseudoexfoliation (without phacodonesis, clinically shallow anterior chambers, or pupil size <4 mm) and 476 controls with cataract but without pseudoexfoliation recruited from 4 centers of the Aravind Eye Care System in Southern India. The 2 groups were randomized separately to receive either a single-piece acrylic intraocular lens (IOL; SA60AT; Alcon Laboratories, Fort Worth, TX) or a 3-piece acrylic IOL (MA60AS; Alcon Laboratories). The pseudoexfoliation group also was randomized to receive or not receive a capsular tension ring.

*Methods:* All eyes underwent phacoemulsification with IOL implantation and were followed up at 1 day, 1 month, 3 months, and 1 year after surgery.

Main Outcome Measures: Association of pseudoexfoliation status with intraoperative complication rates, 1-year best-corrected visual acuity, and any other complications.

**Results:** Mean ages were  $63.0\pm6.9$  years and  $57.9\pm7.3$  years in the pseudoexfoliation and control groups, respectively (P < 0.001). Pseudoexfoliation patients were more likely to be men (P = 0.014), to have a nuclear opalescence grade of more than 4 (P = 0.001), and to have a pupil size of less than 6 mm (P < 0.001) when compared with controls. Intraoperative complication rates were 2.9% and 1.9% in the pseudoexfoliation and control groups, respectively (P = 0.29). One-year postoperative best-corrected visual acuity was comparable (P = 0.09). Complication rates at 1 year were 2.7% and 2.5% in the pseudoexfoliation and control groups, respectively (P = 0.82). Average endothelial cell loss was 14.7% in the pseudoexfoliation group and 12.7% in the control group at 1 year (P = 0.066) when adjusting for age and nuclear opacity.

**Conclusions:** Pseudoexfoliation eyes without shallow anterior chamber, small pupils, or apparent zonulopathy may represent eyes with lower risks of complications. Despite smaller pupils and denser cataracts, pseudoexfoliation eyes without clinically apparent preoperative zonulopathy were not at a higher risk of intraoperative or postoperative complications or worse visual outcomes after cataract surgery. *Ophthalmology 2018*; **e**:1-10 © 2018 by the American Academy of Ophthalmology

# Surgical Complications

Tradada are area 4ª-rea	Group, n (%)					
complication	PEX, n = 930 (%)	Control, n = 476 (%)	P value			
PC Rupture without VL	7 (0.7)	3 (0.6)	0.92			
PC Rupture with VL	10(1.1)	2 (0.4)	0.36			
Zonular dialysis without VL	2 (0.2%)	3 (0.6%)	0.43			
Zonular dialysis with VL	2 (0.2%)	0	0.70			
Capsulorhexis tear	6(0.6)	1 (0.2)	0.43			
Total	27 (2.9)	9 (1.9)	0.29			
	1	Î				

## Patient follow up



## KM survival curve -IOL decentration rates in PEX and Control eyes



Group	IOL	P-value	
	decentration		
Control	5	0.89	
PEX	9		
Overall	14	-	

## KM survival curve –Nd:YAG Capsulotomy in PEX and Control eyes



Group	YAG	P-value
Control	15	0.049
PEX	49	
Overall	64	-

Positioning of the posterior intraocular lens in the longer term following cataract surgery in eyes with and without pseudoexfoliation syndrome

Atle Einar Østern<sup>1</sup>, Gunhild Falleth Sandvik<sup>2</sup> and Liv Drolsum<sup>3</sup>

Acta Ophthalmol. 2014: 92: 253-258

#### Posterior capsular opacification in patients with pseudoexfoliation syndrome: a long-term perspective

Atle E. Østern,<sup>1</sup> Marit Sæthre,<sup>1</sup> Gunhild Sandvik,<sup>1</sup> Marianne Råen<sup>1</sup> and Liv Drolsum<sup>1,2</sup>

Acta Ophthalmol. 2013: 91: 231-235

- 44 patients with pseudoexfoliation syndrome and 85 age-matched controls
- 6–7 years after cataract surgery
  - IOLs were more prone to decentration in PEX eyes, compared to controls
  - Capsulotomy in 16% of eyes with PEX and 16% in controls



# Risk factors for IOL decentration & Nd:YAG capsulotomy

Risk factors	Lens dece	entration	YAG capsulotomy		
	RR (95% CI)	P-value	RR (95% CI)	P-value	
Group					
Control	1.00		1.00		
PEX	0.93(0.31 to 2.77)	0.895	1.77(0.99 to 3.15)	0.053	
Lens					
1-piece	1.00		1.00		
3-piece	1.81(0.61 to 5.40)	0.287	0.78(0.47 to 1.27)	0.316	
CTR					
No CTR	1.00		1.00		
CTR	1.11(0.37 to 3.32)	0.848	1.40(0.85 to 2.31)	0.183	
Age					
≤60	1.00		1.00		
>60	2.17(0.68 to 6.90)	0.192	0.94(0.58 to 1.54)	0.813	
Capsular Phimosis					
No	1.00		1.00		
Yes	6.12(1.37 to 27.35)	0.018	4.94(2.25 to 10.83)	<0.001	
NO					
≤4	1.00		1.00		
>4	3.49(1.17 to 10.41)	0.025	1.12(0.85 to 1.47)	0.421	
Rhexis overlapping					
No	1.00		1.00		
Yes	0.07(0.02 to 0.25)	<0.001	0.47(0.28 to 0.79)	0.004	

# Endothelial Cell Loss & Glaucoma

ECD	PEX Mean(SD)	Control Mean(SD)	Overall Mean(SD)	P-value†	
Baseline	2144.43(349.38)	2241.86(330.66)	2177.44(346.12)	<0.001	+
Year1	1827.59(399.65)	1955.78(402.21)	1872.29(405.01)	<0.001	
Year5	2021.44(413.34)	2109.54(382.65)	2053.06(404.60)	0.002	+
P-value*	<0.001	<0.001	<0.001	-	
	1	1			_

Endothelial Cell Loss- 6% both groups

Gllaucoma- 18 eyes at baseline, 39 at 6 years in PEX group

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#### Association of Pseudoexfoliation With Systemic Vascular Diseases in a South Indian Population

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Table 2. Influence of Pseudoexfoliation on Continuous Serum and Vascular Measures in Multivariable Analyses. Adjusting for Age and Sex						
Outcome Difference (95% CI) <sup>a</sup> <i>P</i> Value						
Blood pressure, mm Hg						
Systolic	4.0 (1.7 to 6.2)	.001				
Diastolic	0.4 (-0.7 to 1.5)	.49				
Blood glucose level, mg/dL 6.2 (-2.0 to 14.3) .14						
Serum cholesterol level, mg/dL -0.6 (-5.1 to 4.0) .81						
Serum homocysteine level, mg/L 0.004 (-0.12 to 0.14) .96						

SI conversion factors: To convert cholesterol to millimoles per liter, multiply by 0.0259; glucose to millimoles per liter, multiply by 0.0555; and homocysteine to micromoles per liter, multiply by 7.397.

<sup>a</sup> Adjusted for age and sex.

### **Aravind Pseudoexfoliation study- Mortality rate**



Cataract with XFS (n=930)	33(3.5)	4(0.4)	11(1.2)	3(0.3)	60(6.5)	111(11.9)
Cataract with out XFS (n=476)	7(1.5)	0	6(1.3)	1(0.2)	26(5.5)	40(8.4)
Total (n=1406) #	40(2.8)	4(0.3)	17(1.2)	4(0.3)	86(6.1)	151(10.7)
P- value	0.03					0.04

# CONCLUSION

- In eyes without phacodonesis and small pupils, risk of surgical complications is not higher than control eyes
- At 5 years pseudoexfoliation without phacodonesis and small pupils does not confer a higher risk for IOL decentration
  - CTR not required in PEX eyes without preop phacodonesis
- However PEX eyes have a higher rate for PCO necessitating Nd:YAG capsulotomy

## Conclusion

- Endothelial cell density was lower in PEX eyes compared to controls, however endothelial cell loss at 5 years
  compared to baseline was similar in both groups
- Higher risk of systemic hypertension and mortality due to Cardiac illness
- Due to increasing risk of developing glaucoma, PEX eyes need long term follow up











