



# Visco-free Phacoemulsification. 551

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## Purpose

- Ophthalmic viscoelastic materials are used to protect the corneal endothelium in the overwhelming majority of cataract surgeries performed in developed countries.
- The possibility of conducting cataract surgery without the use of viscoelastic materials is an appealing one because this could improve surgical efficiency, reduce cost, and mitigate the risk of postoperative spikes in intraocular pressure.
- We hypothesized that visco-free phacoemulsification could be safely performed by combining visco-free capsulorhexis, endocapsular carouseling, and hydroimplantation.

## Surgical Technique

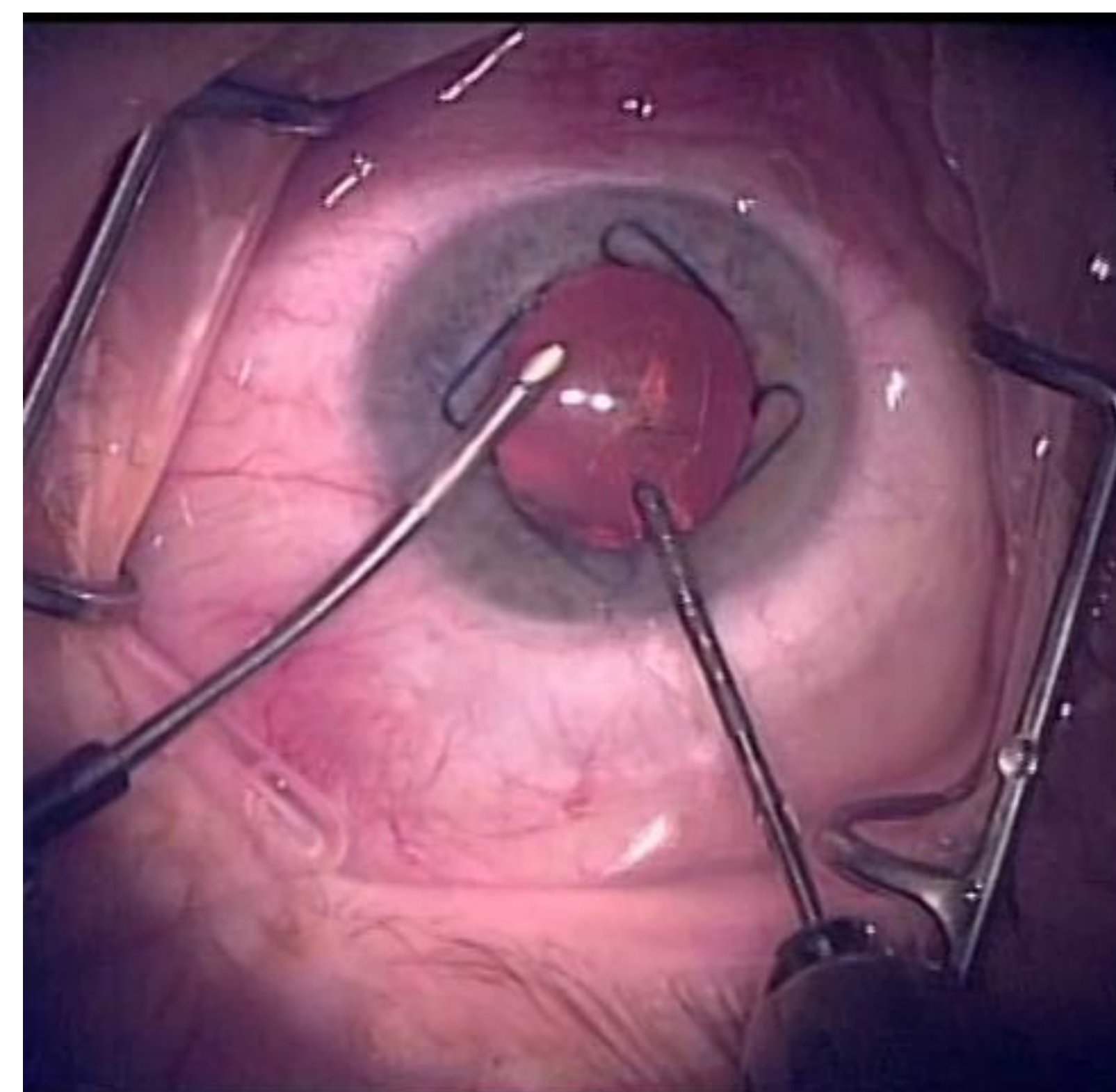


Fig. 1 Visco-free capsulorhexis.

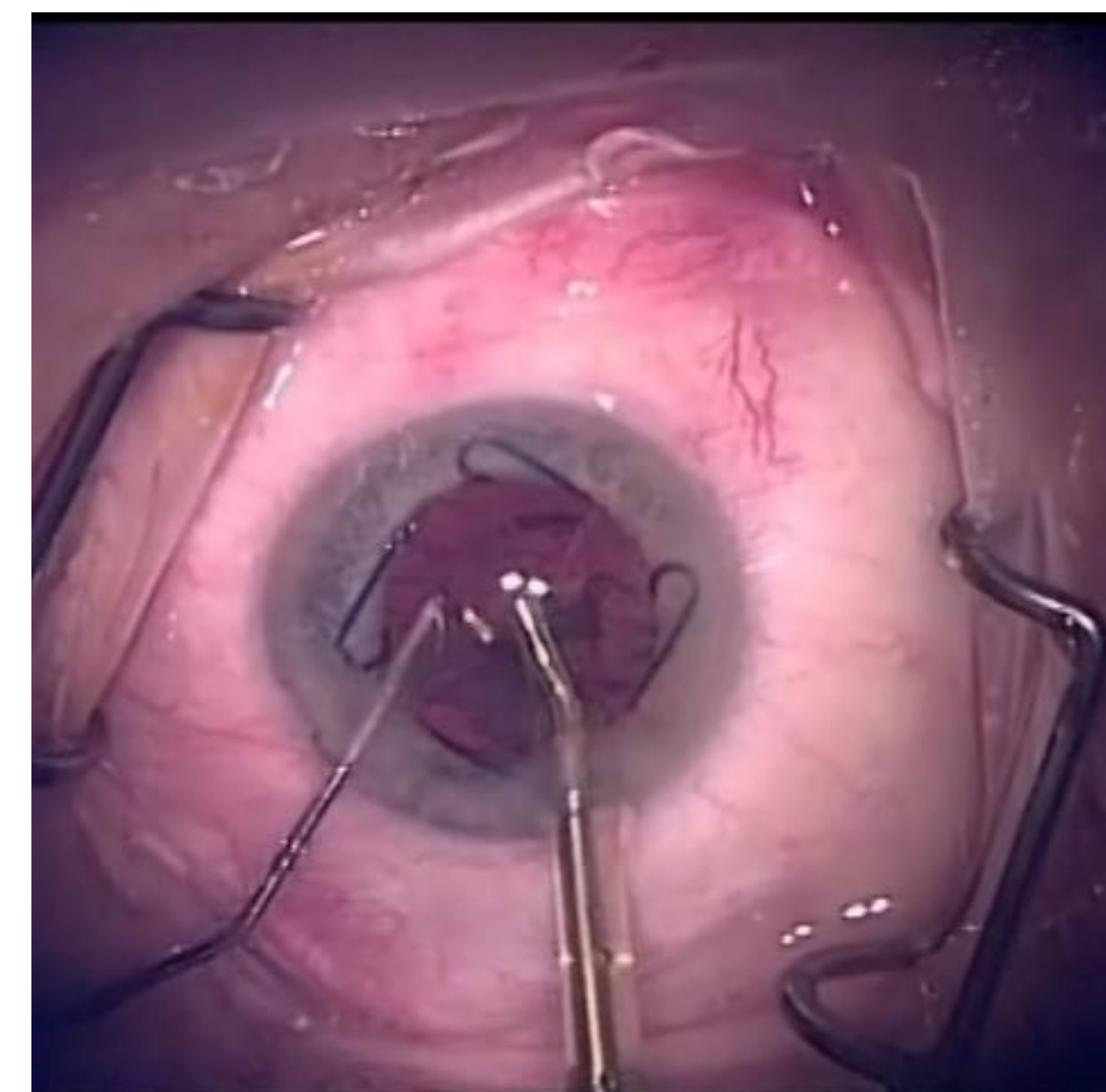


Fig. 2a Endocapsular carouseling.

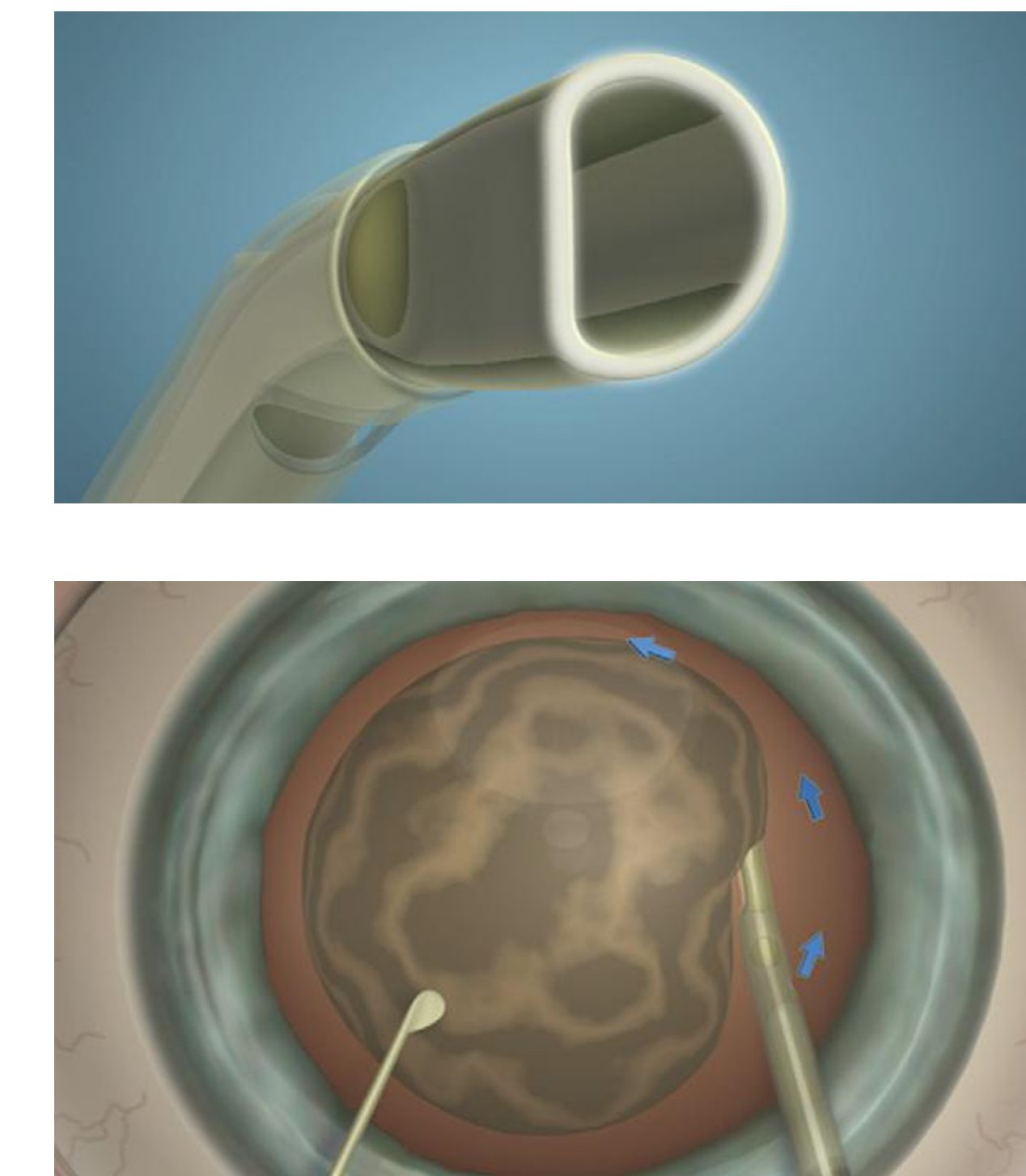


Fig. 2b Carouseling in the bag is made possible by the Ambati D tip (MST)



Fig. 3 Hydroimplantation.

## Study Results

Patient #	Gender	Age	Eye	Cataract Grade	Ocular co-morbidity
1	M	51	OS	2+ PSC <sup>a</sup>	None
2	M	72	OS	2+PSC <sup>a</sup>	None
3	F	65	OD	2+ NS <sup>b</sup>	Dry eye syndrome
4	F	67	OS	2+ NS <sup>b</sup>	None
5	M	78	OS	2+ NS <sup>b</sup>	None

Table 1. Patient demographic data

<sup>a</sup>Posterior subcapsular cataract, <sup>b</sup>Nuclear sclerotic cataract.

Parameter	Preoperative	1 Day Postop	3 Months Postop
Mean Pachymetry <sup>a</sup>	525±33.0	573.8±23.7	529.4±26.2
% increase		9.3% (p=0.09)	0.8% (p=0.47)
Mean Endothelial <sup>b</sup> Cell Density	2314±116	NA	2001±230
% Endothelial Cell Loss		NA	13.6% (p=0.02)
Mean BCVA <sup>c</sup>	20/73±0.46	20/57±0.35	20/28±0.2

Table 2. Preoperative and postoperative endothelial cell count, and pachymetry

<sup>a</sup>Pachymetry performed using a Pentacam HR (Oculus) and reported in  $\mu\text{m}$ . <sup>b</sup>Endothelial cell density measuring using a ConfoScan4 (NIDEK) and reported in cells/mm<sup>2</sup>. <sup>c</sup>Mean Best Corrected Visual Acuity (BCVA) reported in Snellen format with standard deviation stated in logMAR format. Mean BCVA was calculated by finding the geometric mean.

## Conclusions

- All patients demonstrated an improvement in best corrected visual acuity.
- There was no significant change in pachymetry from baseline during the postoperative course.
- There was a statistically significant decrease of 13.6% in endothelial cell density at 3 months post-op (p=0.02). This decrease in endothelial cell density is within the range reported in previous evaluations of phacoemulsification.
- Our results suggest that phacoemulsification without the use of ophthalmic viscosurgical devices can be performed safely and efficiently.
- Long term follow-up and further studies are warranted.

## References

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- Storr-Paulsen A, Norregaard JC, Ahmed S, Storr-Paulsen T, Pedersen TH (2008) Endothelial cell damage after cataract surgery: divide-and-conquer versus phaco-chop technique. J Cataract Refract Surg 34: 996-1000
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## Study Methods

- Retrospective review of 5 consecutive cases of visco-free cataract surgery from five patients with 2+ cataracts.
- Visco-free cataract surgery was performed by combining visco-free capsulorhexis, endocapsular carouseling, and hydroimplantation.
- Outcome measures included:
  - Visual acuity
  - Corneal thickness by pachymetry
  - Endothelial cell density by ConfoScan4 (Nidek, Padova, Italy).