

Video Article

A Novel Capsulorhexis Technique Using Shearing Forces with Cystotome

Shah M. R. Karim¹, Chin T. Ong², Tamsin J. Sleep³

¹Department of Ophthalmology, Hairmyres Hospital, NHS Lanarkshire

²Royal Devon and Exeter NHS Foundation Trust, Department of Ophthalmology

³Department of Ophthalmology, South Devon Healthcare NHS Trust

Correspondence to: Shah M. R. Karim at shahmrkarim@yahoo.co.uk

URL: <http://www.jove.com/video/1962>

DOI: [doi:10.3791/1962](https://doi.org/10.3791/1962)

Keywords: JoVE Medicine, Issue 39, Phacoemulsification surgery, cataract surgery, capsulorhexis, capsulotomy, technique, Continuous curvilinear capsulorhexis, cystotome

Date Published: 5/15/2010

Citation: Karim, S.M.R., Ong, C.T., Sleep, T.J. A Novel Capsulorhexis Technique Using Shearing Forces with Cystotome. *J. Vis. Exp.* (39), e1962, doi:10.3791/1962 (2010).

Abstract

Purpose:

To demonstrate a capsulorhexis technique using predominantly shearing forces with a cystotome on a virtual reality simulator and on a human eye.

Method:

Our technique involves creating the initial anterior capsular tear with a cystotome to raise a flap. The flap left unfolded on the lens surface. The cystotome tip is tilted horizontally and is engaged on the flap near the leading edge of the tear. The cystotome is moved in a circular fashion to direct the vector forces. The loose flap is constantly swept towards the centre so that it does not obscure the view on the tearing edge.

Results:

Our technique has the advantage of reducing corneal wound distortion and subsequent anterior chamber collapse. The capsulorhexis flap is moved away from the tear leading edge allowing better visualisation of the direction of tear. This technique offers superior control of the capsulorhexis by allowing the surgeon to change the direction of the tear to achieve the desired capsulorhexis size.

Conclusions:

The EYESI Surgical Simulator is a realistic training platform for surgeons to practice complex capsulorhexis techniques. The shearing forces technique is a suitable alternative and in some cases a far better technique in achieving the desired capsulorhexis.

Video Link

The video component of this article can be found at <http://www.jove.com/video/1962/>

Protocol

Part 1 : Purpose:

To demonstrate a capsulorhexis technique using predominantly shearing forces with a cystotome on a virtual reality simulator and on a human eye.

Part 2 : Method:

Steps:

1. Our technique involves creating the initial anterior capsular tear with a cystotome to raise a flap.
2. The flap is then left unfolded on the lens surface.
3. The cystotome tip is tilted horizontally and is engaged on the flap near the leading edge of the tear.
4. The cystotome is moved in a circular fashion to direct the vector forces.
5. The loose flap is constantly swept towards the centre so that it does not obscure the view on the tearing edge.
6. Re-engage the needle to the tearing edge frequently to create a suitably sized continuous curvilinear capsulorhexis.

Part 3 : Results:

Our technique has the advantage of reducing corneal wound distortion and subsequent anterior chamber collapse. The capsulorhexis flap is moved away from the tear leading edge allowing better visualisation of the direction of tear. This technique offers superior control of the capsulorhexis by allowing the surgeon to change the direction of the tear to achieve the desired capsulorhexis size.

Discussion

The EYESI Surgical Simulator is a realistic training platform for surgeons to practice complex capsulorhexis techniques. Capsulorhexis is the most important and complex part of phacoemulsification procedure. A successful cataract surgery mostly depends on a good capsulorhexis. The shearing forces technique is a suitable alternative and in some cases a far better technique in achieving the desired capsulorhexis.

Disclosures

No conflicts of interest declared.

Acknowledgements

We would like to thank Dr Clemens Wagner from VR magic for his support. We also like to thank Dr Nail Modi for helping out with the video recording.

References

1. Neuhann, T. Theorie und Operationstechnik der Kapsulorhexis. *Klin Monatsbl Augenheilkd* 190, 542-545 (1987).
2. Gimbel, HV., Neuhann, T. Development, advantages and methods of the continuous circular capsulorhexis technique. *J Cataract Refract Surg* 16, 31-37 (1990).
3. Gimbel, HV., Neuhann, T. Continuous curvilinear capsulorhexis. (letter) *J Cataract Refract Sur* 17, 110-111 (1991).
4. Gimbel, HV. Evolving techniques of cataract surgery: continuous curvilinear capsulorhexis, down-slope sculpting, and nucleofractis. *Semin Ophthalmol* 7, 193-207 (1992).