

# Iatrogenic Zonular Disaster

Sometimes disaster appears in front of your eyes.

BY KHIUN F. TJIA, MD

One of my colleagues visits local nursing homes to examine patients who are not easily referred to our hospital, mostly because of poor physical or mental health. From one such screening session, an elderly woman using a wheelchair was referred to me with poor vision in both eyes. She was a high myope and presented with a grade 4+ brown nuclear cataract in one eye. She was no longer able to watch television or read a newspaper or book. I promised to do the best I could to restore her vision. Unfortunately, an unexpected disaster arose—iatrogenic zonular dehiscence. However, I was able to correct the complication, and the patient achieved good quality of vision in the end.

In this case description with accompanying video clip (available at <http://eyetube.net/v.asp?kozade>), I explain my strategy for this iatrogenic zonular dehiscence disaster. Capsular folds during capsulorrhexis creation (Figure 1) are a clear indication of zonular weakness.

In any eye with suspected weak zonules, it is in the surgeon's best interest to create the largest feasible rhexis to

reduce the stress on the zonules as much as possible. Additionally, the nucleus should be chopped into small pieces that are easily pulled into the anterior chamber, which will facilitate emulsification without inducing zonular stress. I know the theory of these maneuvers very well; however, in this case, I did not execute it accordingly. My failure to chop the nucleus into small pieces led to the iatrogenic disaster of 180° zonulolysis (Figure 2).

## SURGICAL COURSE

What should be done in such a situation? In all cases with a potential (partial) dropped nucleus, leave the phaco tip in the eye to minimize fluid movements, which are the major cause of nuclear material falling backward. With the phaco tip in a still position, remove the second instrument and inject any ophthalmic viscosurgical device (OVD) to stabilize the position of the nucleus. Next, inject a dispersive OVD between the nucleus and the vitreous. My strategy is to create an absolute viscoelastic barrier to prevent any nucleus drop as well as any direct contact

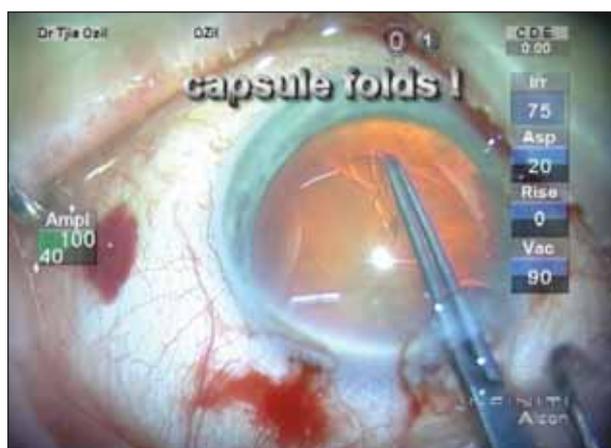


Figure 1. Capsular folds occurring during capsulorrhexis indicate zonular weakness.



Figure 2. Torn zonules are seen in this patient.



Figure 3. (A) Viscoat injection to create an absolute viscoelastic barrier prevents nucleus drop and avoids direct contact with the vitreous. (B) Profuse amounts of Viscoat are injected underneath the nucleus.



Figure 4. A very low aspiration rate is required to avoid aspiration of the OVD shield.



Figure 5. The final outcome.

with the vitreous. In the video and in Figure 3, you see profuse amounts of Viscoat (Alcon Laboratories, Inc., Fort Worth, Texas) injected underneath the nucleus.

### VERY LOW FLUIDICS STRATEGY

In challenging and complicated cases such as zonal dehiscence or posterior capsular rupture, I prefer to use very low fluidics with torsional ultrasound, which I described in *CRST Europe's* Second Annual Cataract Complications issue (February 2007) in detail. Fluidics settings (Table 1) should minimize pressure changes in the anterior chamber, which are to be avoided because high intraocular pressure has the tendency to induce nucleus and/or vitreous movement. A moderate vacuum setting, to avoid significant surge on occlusion break, is recommended.

### TAKE-HOME MESSAGE

- Capsular folds occurring during capsulorrhexis indicate zonular weakness.
- In eyes with suspected weak zonules, the surgeon must create the largest feasible rhexis to reduce stress on the zonules.
- In iatrogenic zonular dehiscence, a very low fluidics strategy with a visco-shield can lead to a good result.
- Eyetube direct link: <http://eyetube.net/vasp?kozade>



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## April 2010

### American Society of Cataract and Refractive Surgery/American Society of Ophthalmic Administrators Symposium and Congress

April 9 to 14  
Boston

Web site: [www.ascrs.org/meetings/future-meetings-dates.cfm](http://www.ascrs.org/meetings/future-meetings-dates.cfm)

## May 2010

### The Association for Research in Vision and Ophthalmology

May 2 to 6  
Fort Lauderdale, Florida

Web site: [www.arvo.org](http://www.arvo.org)

Phone: +1 240 221 2900

Fax: +1 240 221 0370

E-mail: [arvo@arvo.org](mailto:arvo@arvo.org)

## June 2010

### World Ophthalmology Congress

June 5 to 9  
Berlin

Web site: [www.woc2010.de](http://www.woc2010.de)

E-mail: [pco@woc2010.org](mailto:pco@woc2010.org) or [pco@woc2010.de](mailto:pco@woc2010.de)

### Joint Congress of SOE and AAO

June 4 to 7  
Geneva, Switzerland

Web site: [www.soe2011.org](http://www.soe2011.org)

Phone: +46 8 459 6600

Fax: +46 8 661 9125

E-mail: [soe2011@congrex.com](mailto:soe2011@congrex.com)

## July 2010

### The 12th National Congress and 35th Annual Scientific Meeting of the Indonesian Ophthalmologist Association

July 23 to 26  
Semarang, Indonesia

## September 2010

### XXVIII Congress of the ESCRS

September 4 to 8  
Paris

Web site: [www.es CRS.org](http://www.es CRS.org)

Phone: +353 1 209 1100

Fax: +353 1 209 1112

E-mail: [escrs@escrs.org](mailto:escrs@escrs.org)

### The 25th Congress of the Asia-Pacific Academy of Ophthalmology in combination with the 15th National Congress of the Chinese Ophthalmological Society

September 16 to 20  
Beijing

Web site: [www.apao2010beijing.org](http://www.apao2010beijing.org)

## October 2010

### The American Academy of Ophthalmology

October 16 to 19  
Chicago

Web site: [www.aao.org/annual\\_meeting](http://www.aao.org/annual_meeting)

Phone: +1 415 447 0320

Fax: +1 415 561 8576

E-mail: [meetings@aao.org](mailto:meetings@aao.org)

## December 2010

### The Second Biannual Cornea Scientific Meeting

December 1 to 2  
Kyoto, Japan

Web site: [www.asiacorneasociety.org](http://www.asiacorneasociety.org) ■

# COVER STORY

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**TABLE 1. FLUIDICS SETTINGS\* FOR ZONULAR DEHISCENCE/POSTERIOR CAPSULAR RUPTURE**

- Bottle height: 50 cm
- Aspiration Flow: 12 mL/min
- Vacuum: 300 mm Hg

\* Settings used with the Infiniti (Alcon Laboratories, Inc.)

A very low aspiration flow rate (Figure 4) will reduce the speed of phacoemulsification but, more important, it will not aspirate too much of the visco-shield between the vitreous and the nucleus. With an adequate visco-shield in place, you can emulsify the nucleus safely in the anterior chamber. Prior to emulsification, the nuclear pieces should be brought up to the safe zone in the anterior chamber. This can be achieved with the help of the dispersive OVD, as illustrated in the video.

Torsional ultrasound enables the surgeon to emulsify nuclear material efficiently, regardless of density, at very low fluidics settings. There is virtually no chatter of nuclear chips, which could lead to unnecessary manipulation and increased risk for nuclear material to drop into the posterior segment. When using longitudinal ultrasound in cases with zonular dehiscence or posterior capsular rupture, reducing the ultrasound duty cycle significantly will reduce repulsion.

After all nuclear material has been emulsified, the protective visco-shield can be removed with bimanual vitrectomy. Diluted triamcinolone is employed to identify and remove any remaining vitreous.

## CONCLUSION

This seemingly hopeless complicated case ended with a positive outcome. The elderly woman decided to remain aphakic as a +4.00 D hyperope, with excellent television and reading vision. She was happy with her final result (Figure 5).

A very low fluidics strategy in the presence of a protective dispersive visco-shield provides the surgeon with a safe and controlled technique to successfully manage an iatrogenic posterior capsular tear or zonular dehiscence. ■

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1. Tjia K. A low fluidics parameters strategy. *Cataract & Refractive Surgery Today Europe*. 2007;2(2):52-53.