INTRODUCTION
Whenever a zonular dialysis is encountered during cataract surgery, it means two things

1. PRE EXISTING zonular weakness – congenital or acquired.

2. BROUGHT INTO EXISTENCE by the operating surgeon.

In the latter, the detection at the earliest remains the crucial point which determines the subsequent management and the final outcome of the surgery. Once detected, the surgeon has to swallow the unpleasant surprise and overcome the challenge. A prior plan to handle such a surprise can result in a positive visual outcome.

B. CAUSES

PRE EXISTING ZD.

1. History of - trauma, ocular surgery [eg. vitrectomy].

2. PXF.

3. High myopia

4. Systemic conditions - congenital, metabolic, and endocrine disorders that affect the ciliary zonules, such as Marfan syndrome, Marchesani’s syndrome, scleroderma, homocystinuria, spherophakia, porphyria, and hyperlysinemia
IATROGENIC.

1. Entrapment of the lens capsule by phacoemulsification probe.

2. Inappropriate manipulation or mechanical force.
DETECTION

1. Tilted or eccentric lens.

2. Phacodonesis.

3. Lucid interval of red reflex between the margin of the iris and lens.

4. Vitreous prolapse into the anterior chamber.

5. Most significantly, sudden deepening of the anterior chamber is frequently the first sign of zonular disruption or posterior capsular tear.

6. Focal iridodonesis.

7. Iridolenticular gap.

PREOPERATIVE
MANAGEMENT

SCHEMATIC

SURGERY IN PROGRESS

DIALYSIS NOTED

CONTINUE WITH PHACOEMULSIFICATION

CONVERT TO ECCE

1. IRIS /CAPSULE HOOKS IN INTRA OPERATIVE ZD

2. CAPSULAR TENSION RINGS/ SEGMENTS [WITH OR WITHOUT FIXING SUTURE]

DECIDE DEPENDING ON:

- DENSITY OF THE LENS
- STABILITY AND STRENGTH OF REMAINING ZONULES.
TO EXEMPLIFY:

1. If the patient is young and the lens is soft, the nucleus can most likely be removed with slow aspiration, even in the presence of a large dialysis if the remaining intact zonules are strong.

2. Conversely, if the lens is brunescent in the setting of pseudoexfoliation (PXF), even a 2 clock-hour dialysis may be too large to complete successful phacoemulsification.

IRIS /CAPSULE HOOKS IN INTRA OPERATIVE ZD

✓ Flexible iris retractors have been reported to facilitate phacoemulsification in eyes with small pupils or known zonular weakness preoperatively.

✓ In case of zonular dialysis during phacoemulsification, Sufficient viscoelastic material is injected into the area of dialysis immediately to prevent further anterior vitreous prolapsed.

✓ Stab incision over the peripheral cornea over the dialysis sector to be made.

✓ Flexible iris/capsule retractor is inserted through the stab incision, and the capsulorhexis margin is hooked and pulled peripherally to stabilize the flaccid dialyzed capsule.
✓ Phacoemulsification vacuum pressure is reset to lower levels.

✓ The height of the infusion bottle is lowered to reduce the anterior chamber turbulence.

✓ A large diameter PCIOL is implanted into the lens bag.

✓ One haptic is rotated into the area of the dialysis site to expand the wrinkled lens bag in order to prevent it from interfering with post-operative vision.

✓ Unlike the non-fixed endocapsular tension ring, which redistributes the suspensor force to the residual capsulozonular apparatus, iris retractors provide additional suspension over the zonular dehiscence site and prevent significant anterior-posterior capsular bag movement.

✓ It stabilizes the capsular bag relative to the sclera and allows the residual lens material to be removed carefully with Phaco and I/A probe.

✓ Theoretically, iris retractors can offer a more stable hydrostatic situation in eyes with limited range of zonular rupture than the non-fixed endocapsular ring does.
CAPSULAR TENSION RINGS IN INTRA OPERATIVE ZD

These rings stretch the capsule equator and distributes the forces equally over all zonules.

In regions in which zonular support is absent or inadequate, the ring supports the capsular bag and facilitates surgery.

Capsular tension rings are indicated in cases of mild, generalized zonular weakness or small localized zonular dialysis (less than 3–4 clock hours).

CTR s may not supply enough intra- and postoperative support to maintain the desired orientation of the capsular bag in cases with more profound zonular dialysis or weakness.

Modified CTRs designed for scleral fixation are indicated in these eyes.

KEY POINTS FOR SUCCESSFUL INSERTION OF CTR:

1. Use high-viscosity visco-elastic material.

2. Making the incision at a meridian with intact zonules.

3. To avoid damaging zonular fibers with the movement of the phacotip.

4. Slow-motion phacoemulsification with

   - low flow rate
   - low vacuum and
   - low bottle height.
CATARACT SX WITH PREEXISTING ZD

✓ A preoperative planning is a must before contemplating surgery in cataract with pre-existing dehiscence.

✓ Topical NSAIDs for 1 week preoperatively can be used because of the higher risk for intraoperative complications and postoperative cystoid macular edema. [especially in cases with pseudoexfoliation]

✓ Anticipating a potentially longer operative time, one should use peribulbar or retrobulbar anesthesia instead of topical anesthesia in these cases. This also makes it easier to convert to a manual ECCE if necessary.

✓ If a large zonular dialysis is present, perform a scleral tunnel rather than a clear corneal incision to facilitate converting to a large-incision ECCE.

✓ The anterior capsule should be stained with trypan blue.

✓ Chondroitin sulfate is best suited in cases with a zonular dialysis due to its dispersive/highly retentive properties. The chondroitin sulfate will push back the vitreous face and is not as quickly aspirated.

✓ The lens must be completely hydrodissected and hydrodelineated to decrease stress on the remaining zonules when the lens is manipulated.

✓ Avoid a 4-quadrant divide-and-conquer approach, which necessitates numerous rotations within the capsule.

✓ Instead, the use of phaco chopping methods is preferred in order to minimize stress on the zonules and capsular bag.

✓ If the dialysis is greater than 3 clock hours, the lens is brunescent, the pupil dilates poorly, and the integrity of the remaining zonules is compromised,
then phacoemulsification of the lens—even with the use of capsular hooks and CTRs—may not be the best approach.

**SUMMARY**

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<td><strong>Stepwise Approach to Evaluation of Zonular Dialysis</strong></td>
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<td>1. Careful history (trauma, silicone oil, systemic disease)</td>
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<td>2. Preoperative evaluation (PAR, phacoemulosis)</td>
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<td>3. Patient consent/counseling</td>
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<td>4. Preoperative planning—chondroitin sulfate, capsule staining, capsular hooks, capsular tension rings (CTR), scleral tunnel, preoperative nonsteroidal anti-inflammatory drugs (NSAIDs)</td>
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<td>5. Anesthesia considerations—peribulbar block rather than topical</td>
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<td>8. Plan for conversion to extracapsular cataract extraction (ECCE)/intracapsular cataract extraction/pars plana vitrectomy (PPV), pars plana lensectomy (PPL)</td>
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REFERENCES
