



PHACO STRATEGIES WITH ZONULOPATHY

David F. Chang, MD

Weak zonules complicate every step of the cataract procedure and challenge surgeons to diagnose and manage intraoperative zonulopathy (Figure 1-1).¹⁻¹⁰ Even if the capsular bag is successfully preserved, the surgeon must then consider and optimize long-term intraocular lens (IOL) fixation and centration in the setting of concurrent and potentially progressive zonular abnormality.¹¹ The most common predisposing risk factors for zonular weakness include pseudoexfoliation, advanced age, prior trauma, retinopathy of prematurity, and prior intraocular surgery (eg, prior vitrectomy or trabeculectomy). Less common risk factors would be conditions such as Marfan syndrome, retinitis pigmentosa, and myotonic dystrophy.

Preoperative Signs of Zonulopathy

The presence of a traumatic mydriasis, angle recession, iridodialysis, and vitreous herniation is invariably associated with traumatic zonulopathy or zonular dialysis. Suspicion should be high with any history of blunt force trauma, particularly if there was a traumatic hyphema. In the absence of preoperative phacodonesis or visible zonular dialysis, however, the extent of zonular weakness is usually not known until the initiation of surgery. Robert Osher has described subtle signs of zonular weakness that include a wider iridolenticular gap (space between the iris and the anterior lens surface), a decentered nucleus, focal iridodonesis, and visibility of the peripheral lens

equator upon lateral gaze.¹² Iridodonesis is best detected at the slit lamp prior to pupil dilation.

Pseudoexfoliation is associated with progressive zonulopathy and is characterized by whitish deposits found not only on the zonules but also on the posterior iris surface and pupillary margin. Therefore, smaller pupils are often associated with more advanced zonulopathy. Likewise, a brunescent nucleus is frequently accompanied by diffuse zonular weakness. An ominous preoperative sign with pseudoexfoliation is an unexpectedly shallow anterior chamber despite a normal axial length; this invariably indicates extremely weak zonules.^{4,9} One should consider a retro- or peribulbar anesthetic block in cases at higher risk of capsular or zonular tears. Because of the progressive nature of the associated zonulopathy, it can be argued that pseudoexfoliation is an indication to perform cataract surgery earlier rather than later.

Capsulorrhexis

In higher-risk cases, I consider the capsulorrhexis to be a zonular stress test, because the first indication of how weak the zonules are becomes evident during this step. There are a variety of clues that indicate focal or diffuse zonulopathy.

The earliest sign of severe or diffuse zonular weakness is difficulty incising the anterior capsule with the cystotome (see Figures 1-1B and 1-2). If the anterior capsule is not taut, the cystotome tip will tend to first dimple, wrinkle, and indent it, rather than immediately puncture it, and a halo-shaped light reflex around the cystotome tip may be noted (see Figure 1-2).