An 84-year-old man presented to our clinic with decreased vision in the right eye (OD) that had occurred without any significant history. He had undergone cataract surgery in both eyes (OU) with implantation of a multifocal toric intraocular lens (IOL) four years previously, reporting good subsequent vision.

Examination was as follows:
- Distance visual acuity (VA) OD: 0.95. VA: Left eye (OS): 0.05. With +12.00 sphere −2.00 cylinder at 180°: 0.80.
- Biomicroscopy (BMC): OD: Pseudophakia with acrylic monoblock multifocal toric posterior chamber IOL. Centred YAG laser capsulotomy. OS: downward subluxation of bag-IOL complex with half-pupil in optical aphakia. No vitreous in anterior chamber. Intraocular pressure (IOP): OD: 12 mmHg; OS: 12 mmHg.
- Fundoscopy: posterior pole and periphery, normal findings OU. Macular optical coherence tomography (OCT): Normal findings OU. Endothelial count: OD: 1455 cells/mm²; OS: 1340 cells/mm².
- Ultrasound biomicroscopy (UBM): OS: Posterior luxation of bag-IOL complex, located at 4 mm from the pupillary plane.
- Corneal topography: Regular corneal astigmatism of 2.25 dioptres (D) at 90° (curved axis) OU.
Questions: What therapeutic strategy would you propose for the OS? Describe the surgical technique, type of IOL if you decide to perform lens exchange, calculation method, etc. Is this complication common? Would the presence of an intracapsular ring affect your surgical indication?

In principle, it is always better to resuture an intraocular lens (IOL) when possible, as it is a shorter surgery, with less trauma, inflammation, etc. In this case, there are aspects in favour of resutting, such as the fact that the luxation is not complete; against this is the fact that this is a multifocal toric IOL. I have no experience in resutting toric IOLs, but I do have experience in resutting monoblock multifocal lenses with haptics (not plate). The key is to know if the patient has a ring (not clearly indicated in the history) or whether the haptics of the IOL are situated up-down or laterally. Another important fact is to know if the subluxation is only downward or inferolateral (more common in pseudoexfoliation).

If the bag has a ring or there is a superior haptic, I would try to resuture the IOL. Following peri- or retrobulbar anaesthesia, and under mydriasis, I would first mark the 90° axis and optical centre of the cornea. I would then make a large superior scleral flap and pass two 9/0 Prolene sutures above and below the haptic or ring. Passing above or below the haptic is a manoeuvre that is not too complicated using a 23 needle that guides the Prolene needle right into the place. Several techniques have been described which are easy for an experienced surgeon. The fact that the IOL is very far from the pupilary sphincter is not a problem either, because as soon as the anterior chamber is opened, the subluxated IOL rises. Once the two sutures have been passed, I would put a slipknot leaving the IOL subluxated and, without pulling or tightening the loop, close the anterior chamber and aspirate the viscoelastic in the anterior chamber. When this intraocular surgery was finished, I would raise the patient (without removing dressings or the blepharostat) until his head is as vertical as possible while still in a sterile situation, I would pull the short end of both sutures to centre the IOL vertically, so that the central ring of the multifocal IOL is on the mark of the optical centre of the pupil and the toric marks of the IOL are on the mark of the 90° axis. After the IOL was centred, I would make a second non-slipknot to fix the suture, and then lie the patient down again to finish the surgery. The traction of both sutures that are somewhat separated but in the superior zone makes the IOL centre not only vertically but also horizontally, and possibly around the zone of the 90° axis. Although these manoeuvres appear difficult, they are not complicated, and with the patient raised the lens remains in a position similar to the vertical position in which the patient moves and uses the multifocality. Of course we cannot be fully sure of leaving the perfect toric axis, but we may leave the IOL in a range of ±5-10°.

If it is not possible to centre the IOL well, there is no ring, the haptics are superior, or it is a plate IOL with no haptics, I would be inclined to perform an IOL exchange. The best option in this case might be a multifocal iris-claw IOL, attempting to correct the residual astigmatism in a second procedure and explaining to the patient that, in this eye, he will see only in one focus that we will choose according to the distance/near vision of the contralateral eye (the near vision of the contralateral eye is not indicated). This IOL can be calculated using preoperative parameters if possible. This second option can be done, but is more aggressive and may have an effect on a corneal endothelium with a relatively low endothelial count.

Deciding which technique is best is not easy, and the possible approaches must be explained to the patient so as not to create false expectations. Multifocal and/or toric IOLs clearly work well if there is perfect centring of the IOL, which is lost in a subluxation. The advent of multifocal and toric IOLs will undeniably result within a few years in an increasing number of cases of subluxated IOLs in patients with myopia, pseudoexfoliation, elderly patients, etc. IOLs or surgical techniques that will help us to resolve the problem of these subluxated toric IOLs must be developed.

REFERENCES


Javier Moreno-Montañés, MD, PhD
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We have two surgical options: 1) reposition the bag-intraocular lens (IOL) complex, or 2) extraction + secondary implant.

The fact that the IOL is a multifocal toric lens seriously complicates the repositioning, since the complex would have to be left on the correct axis, which is unlikely to be feasible (it would be necessary to see a photo to assess the situation of the haptics and whether on tractioning the complex they would be placed on their meridian).

For this reason, we would opt for extraction + implantation of a secondary lens. Due to his age, the patient might tolerate the new situation well: multifocal lens in one eye and monofocal in the other.

The technique that we use is:

- 6-mm scleral pre-incision in the superior zone and 1-mm paracentesis at 3 o’clock and 9 o’clock. We would inject triamcinolone in the anterior chamber to assess the presence of vitreous and to minimise subsequent inflammation. If there is vitreous, we would perform a closed chamber vitrectomy, i.e. through the paracenteses.

- We would enter the anterior chamber through the scleral tunnel incision with a 5.2-mm knife and extend to 6 mm. At this time, the entire complex moves forward, facilitating its extraction, which we carry out using Clayman forceps in a zig-zag movement, trying not to rupture the capsular bag. Then, after ensuring that there is no vitreous, we inject acetylcholine to contract the pupil.

- We have three options for the secondary implant: pre-pupillary iris-fixed lens, retro-pupillary iris-fixed lens or anterior chamber lens. Choosing one or the other will depend on the state of the cornea, iris and chamber angle.

- The visual outcomes, as well as complications, were similar in the three groups when we analysed our results.

- We could conclude the surgery by suturing the incision after removing the viscoelastic from the anterior chamber and performing an iridectomy.

It is very important to reassure ourselves that no vitreous remains in the anterior chamber. If a retro-pupillary lens is implanted, we must take into account that the constant is different, even if the lens is the same. This condition is very common in areas where there are high rates of pseudoexfoliation (in Ourense, Spain), 22% of patients aged under 80 years who are to undergo cataract surgery have pseudoexfoliative syndrome, while up to 33% of those over 80 have this condition). It is very difficult to know the exact incidence, but in our hospital it is around 0.03%. When a ring has been implanted, the luxation occurs earlier (±6 years), possibly because the ring was implanted due to an altered zonule. The advantage is that its presence facilitates replacement of the bag-IOL complex.

REFERENCES


Ramón Lorente Moore, MD, PhD
Ourense, Spain

I believe that in this patient, as in all, the most important thing is to look at the characteristics, life expectancy, expected results and, most importantly, primum non nocere.

The case described does not mention the type of lens that was implanted. Although the images suggest that it is a plate design, based on the indications in the contralateral eye, it is a monoblock lens, but there is no further information. The disinsertion of the bag-lens complex appears to be larger than two quadrants, causing a posterior tilt at 12 o’clock. The visual axis is completely compromised with pseudophakic aphakia due to loss of central positioning.

With respect to the surgical technique of choice, in this case several premises should be taken into account: the patient’s age and life expectancy, corneal astigmatism (in this case the most curved meridian is at 12 o’clock), endothelial count (which is acceptable for the patient’s age) and previous surgery.

First of all, I would rule out fixing the lens at 12 o’clock due to the complexity of the procedure since, in principle, I do not have exact data on the model of lens implanted, and because the probability of repositioning the lens at 12 o’clock with a sulcus suture with haptic/capsule capture (if possible) would almost certainly produce tension of the inferior zonule. This would result in subsequent inverse subluxation, entailing a new surgery and more than likely endothelial compromise due to the manoeuvres.

Moreover, if the patient has had a capsulotomy in the contralateral eye, it would probably produce traction.
In this case, in my opinion, I would make a wide opening at 12 o’clock that corresponds with the most curved meridian, with excision of the bag-lens complex using a Kelman forceps and aided by a manipulator, as there is no previous vitreous. This would be followed by an anterior vitrectomy if required (but which I do not believe would be necessary given the patient’s age) and vitreous liquefaction.

With respect to the lens to implant, the first thing is to explain to the patient that we will restore visual function, although the distance or near vision may be somewhat reduced by possible refractive surprise. I think that, owing to the patient’s characteristics, ideally the lens should not be sutured to the sulcus. I think that it is an ideal case for an iris-supported lens (sacrificing the lens multifocality), either in the posterior chamber (preferably) or in the anterior chamber, depending on the surgeon’s skill, after intracameral instillation of acetylcholine and then subsequent corneal suture with 2 soft appositional sutures. I have not described the implantation technique because it is well known.

The anaesthetic technique in this case would be parabulbar or sub-Tenon’s, which is not very traumatic, mild and sufficient for the manoeuvres to be performed.

The lens calculation is complex and I think exceeds the space allocated to me here, but will depend on whether the lens is fixated in the posterior or anterior chamber. It is important to know the previous biometry, although the low visual acuity attained by the patient with aphakic correction is notable; however, it appears to be an eye with a standard length and using the SRK-T would be sufficient, making the conversion post-positioning.

With late subluxations on the increase, earlier cataract surgeries and increasing life expectancy, we are always thinking of what we can resolve but little about what will happen with the passing years. Intracapsular rings are underused and undervalued, yet they are easy to implant, do not cause optical or pathophysiological alterations, iatrogenesis is practically zero and they can be of great prophylactic help; moreover, in cases like this one, a double suture to sulcus could have been done with the simple ring capture. The cheap option sometimes ends up expensive and complex.

José Luis Rodríguez-Prats, MD
Alicante, Spain

What therapeutic strategy would you propose for the OS? Describe the surgical technique, type of IOL if you decide to perform lens exchange, calculation method, etc.

This is a late subluxation of the bag-intraocular lens (IOL) complex, with no apparent history of trauma, as is typical of this complication. Although there is no photographic image of the anterior pole, it appears to be a grade III superior subluxation, so it can be seen by ultrasounds biomicroscopy (superior zonular fibres appear broken and capsular bag suspended only from some inferior zonular fibres; the optics of the IOL occupy half the visual axis with a severe decrease in visual acuity [VA]). Given the characteristics of the luxation, with no apparent vitreous in the anterior chamber, no reported capsular contraction of the rhexis or excess cortical material between the optical zone and upper haptic, IOP of 12 mmHg, etc., I believe the best strategy would be to reposition the bag-IOL complex and suture to the sulcus. In this case, the complexity of the surgery lies not only in the subluxation of the complex and its surgical approach, but also in the fact that the luxated lens is multifocal and also toric. Thus, unlike monofocal lenses, they are very sensitive to small degrees of decentring and tilt after the repositioning. Since this is a toric lens with a regular with-the-rule astigmatism, with the patient seated, we would previously mark the horizontal axis and 90° axis using a fine-tip marker (aided by the grating and beam of the slit lamp) where the IOL is to be reinserted and the bag, taking into account the astigmatism marks marked on the IOL optic.

To perform the ab externo scleral sulcus fixation, we would first make a small limbal-based triangular scleral flap at 12 o’clock (having previously marked the 180° and 90° axis), after conjunctival dissection. This flap will be the scleral transfixion site through which the needle will be passed (to approximately 1.5 mm from the limbus) to make the manoeuvres to fixate the complex. We would use two needles to suture to the sclera: one 27G (insulin) needle that we will use as a guide to make sure of the exact site through which the suture must pass, and a double-armed 9/0 Prolene (polypropylene) suture (preferable to 10/0 Prolene) with a straight needle.

The method used would be the classic Hoffman technique. We would first pass the insulin needle below the scleral flap made at 1.5 mm from the limbus, cross the capsular bag below the haptic and hold it there with the bevel facing upwards. In order to perform this manoeuvre, we would exert counter pressure with the other hand with the aid of forceps to control the penetration movement. From 6 o’clock, we would insert — through a corneal paracentesis — the straight Prolene needle through the anterior chamber to dock it inside the insulin needle that we have inserted through the sclera from 12 o’clock; we would then remove the insulin guide with the Prolene needle inside. We would reinsert the empty insulin needle through the sclera.
and at 1 mm from the previous entry point, repeating a similar manoeuvre, through the same corneal paracentesis, but placing it this time above the haptic. In this way, on bringing the Prolene out again and pulling the ends, we tighten and knot until the complex is centred and in the most curved axis, in this case 90°. It is very important to ensure that the Prolene knot is perfectly buried under the previously cut scleral flap, to avoid discomfort due to exposure to the knot.

**Is this complication common?**

Subluxation of the capsular bag-IOL complex is a rare entity that usually occurs spontaneously several years after uncomplicated cataract surgery following phacoemulsification. It is generally due to progressive zonular weakness and to the radial traction induced by the progressive dehiscence caused by the capsular fibrosis. Its cumulative incidence in the general population is around a 0.1% risk at 10 years of follow-up, but 1.7% after 25 years. However, the exact incidence of this entity remains to be determined, and is expected to continue to rise. The most common predisposing factors include pseudoexfoliation (45%), retinitis pigmentosa (10%), capsule contraction syndrome (5%), myopia magna, long axial length (5%), uveitis, atopic dermatitis, gyrate atrophy, acute glaucoma, etc. What does seem certain is that this entity is typical of the era of cataract surgery by phacoemulsification and circular capsulorhexis, with no apparent cases having been described in the era of extracapsular extraction of the cataract.

**Would the presence of an intracapsular ring affect your surgical indication?**

The presence of a ring would clearly facilitate repositioning and fixation of the complex to the sclera. If the lens to be repositioned had a plate and not a loop format (acrylic monoblock multifocal toric posterior chamber IOL), it would be almost indispensable. It would be important to know the exact loop design of the monoblock lens to be repositioned, since if we do not have a capsular ring (as is the case), both the length of the haptic and its morphology (fenestrated haptics) could make it difficult to perform the technique described and correctly centre the multifocal toric lens. If the IOL had holes in the haptics, this would give us more security in fixation to the sclera. If correct centring was not achieved with a single fixation point, I would consider fixing the lens through two sites.

The optimal action protocol for treatment of this entity is controversial both as regards when to act, the procedure, etc. Several options can be considered, depending on the grade of luxation of the bag-IOL complex, with or without a capsular ring (I-IV): Reposition the bag-IOL complex-ring or replace it with another lens. If we decide to extract the bag, we can use either the anterior or posterior route (through the pars plana). This approach depends on the preferences and speciality of the surgeon, and characteristics of each case, including the type of IOL and presence of a capsular ring, IOL dislocation stage and site, etc. In this case, it was decided to reposition the lens, for the reasons given above. Another option would be extraction of the bag and replacement with a new lens. We consider anterior extraction of the bag-IOL to be the simplest procedure for all grades of luxation, except for stage IV, in which the lens is already luxated in the vitreous and the best approach is through the pars plana. The anterior approach is simple but requires good anterior vitrectomy to prevent vitreous traction, in cases where there is vitreous in the anterior chamber or adhered to the capsular bag. In most cases, there is little vitreous in the anterior chamber, and if there is, it is very liquid. The ideal site to implant the new lens after extracting the bag is also controversial. It could be implanted in the anterior chamber (angle-supported lens) or sutured to the sulcus. It has not been possible to demonstrate the superiority of any technique. However, in our experience, we consider the technique of choice to be the anterior approach with subsequent implantation of an iris fixation lens (Artisan Aphakia IOL, Ophthec BV; Advanced Medical Optics, Inc.), as it offers better stability, facilitates centring, speed of implantation technically and respects the iridocorneal angle. We did not consider bilateral implantation of multifocal lenses as first choice in this patient. In cases of low endothelial count, there is the option retro-pupillary implantation.
of silicone lenses, especially plate-type. The role of the intracapsular ring in preventing this syndrome is very controversial, because several cases have been described in different series where this syndrome has occurred in the presence of capsular rings\textsuperscript{8,9}. However, some authors suggest that in predisposed patients, the presence of a ring can lengthen the luxation time period between the surgery and dislocation of the complex\textsuperscript{8,9}. Capsular rings do not prevent late luxation, but they decrease the capsular contraction and their presence will facilitate repositioning of the complex in the future, if necessary\textsuperscript{11}.

**REFERENCES**


**Cristina Peris, MD, PhD**

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Since there are no three-piece multifocal toric IOLs on the market that can be sutured in the ciliary sulcus, we must choose between implanting a three-piece multifocal IOL and then correcting the astigmatism by treating the cornea with either photorefractive keratectomy (PRK) or Lasik, or implanting a three-piece toric IOL, also sutured to the iris and doing without the multifocality.

Both possibilities should be discussed with the patient, as elderly patients like this one often reject the option that involves more trips to the operating theatre.

Supposing that the patient wants to recover all the functions that he enjoyed before luxation of the bag-lens complex, the best option is implantation of a three-piece multifocal IOL (of which there are various models on the market from Alcon and Human Optics among others) that can either be sutured transsclerally (Malbran technique) or is sutureless, externalising the haptics and inserting them into limbus-parallel scleral tunnels, using the Gabor technique or with biological glue, as explained by Agarwal and Kumar in various articles.

My preference in this situation would be towards the sutureless Gabor technique, and the approach for the explantation and insertion of the new lens would be through a scleral tunnel frown or suspension bridge incision.

The corneal astigmatism will then be corrected by either Lasik or PRK, which also has the advantage of being able to adjust the final refraction very accurately.

If the patient was not particularly interested in maintaining multifocality, a valuable option due to its simplicity and efficacy is implantation of an iris-fixated or iris-claw lens, which after explantation of the bag-IOL complex, would allow appropriate correction of the aphakia and astigmatism.

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Francisco Poyales Galán, MD
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