

## Commentary: Pupil expansion devices: A boon for safe cataract surgery in small pupils

All cataract surgeons at some point would encounter a case of poorly dilating pupils. Small pupils increase the risk of intraoperative complications such as posterior capsular rupture and endothelial damage, besides increasing the stress on the surgeon.<sup>[1]</sup> Nondilating pupils can be tackled easily with simple stretching of the pupils using Kuglen hooks (Bausch and Lomb, Rochester, New York, USA)<sup>[2]</sup> or by incisional methods such as multiple sphincteromies and broad or keyhole iridectomies in extreme cases. Disposable iris hooks (Grieshaber and Co AG, Schaffhausen, Switzerland) provide excellent exposure of the lens and can be placed either before performing the capsulorhexis or on encountering intraoperative miosis. The best use of retractors is of course in cases of intraoperative floppy iris syndrome, which is a condition that has been now well recognized and is encountered more and more.<sup>[3]</sup>

Given the pressing need to perform phacoemulsification over all other techniques of cataract extraction due to its obvious advantages of rapid visual recovery, the permanent pupillary distortion of the abovementioned techniques would work against a near-perfect anatomical and visual result. Moreover, the use of premium intraocular lenses (IOLs), such as toric and multifocal IOLs, dictates that the post-operative pupil should be central and not distorted or dilated in order to achieve an excellent outcome.

Various pupillary expansion devices (PEDs) are available for use. The Malyugin Ring<sup>[4]</sup> (MicroSurgical Technology, Redmond, WA), AP × 200 (APX Ophthalmology) is by far the most popular device used worldwide. This ring wins over the others due to its convenient insertion through a small clear corneal incision with the use of an injector, thus requiring minimal manipulation by the surgeon. The material is rigid and can expand a small pupil as it expands in the eye. The “safety-pin” bends engage the pupillary margin nontraumatically, and while the pupil stays well dilated intraoperatively, the amount of distortion of the pupil post-operatively is minimal, thus producing a cosmetic result as well as absence of symptoms of glare. The Bhattacharjee B-HEX Pupil Expander<sup>[5]</sup> (Med-Invent Devices, Kolkata, India) is an indigenous device and is rapidly gaining popularity. This highly flexible device has a hexagonal shape and ensures pupil expansion of approximately 5 mm throughout the surgery. The insertion and removal are easy with a small learning curve and can be done even though a 1-mm incision. In the case of rigid pupils and pupils bound down due to posterior synechia etc., the pupils need to be first mechanically dilated and then the ring can be placed. The advantage of this device is that it is inexpensive and has lesser post-operatively pupillary distortion as compared to iris hooks.

Other devices include the 5S Iris Ring (Morcher, GmbH, Stuttgart, Germany), Beehler Pupil Dilator (Moria, Antony, France), Perfect Pupil (Milvella Inc. Eden Prairie, MN), Graether Expander (Eagle Vision Inc., Memphis, TN), Canabrava Ring (CR; AJL Ophthalmic SA, Spain), and the I-Ring (Beaver-Visitec International, Waltham, MA, USA);

these devices can dilate the pupil more than 6.5 mm and are associated with least post-operative distortion. The limitation is the slightly more complex insertion and the cost of these devices restricting their use in low-cost economical cataract surgical units. In conclusion, the surgeon has a wide variety of PEDs to choose from, based on the etiology of the small pupil and the cost and familiarity of the PED. Further, the use of such devices ensures a safe surgical outcome for the patient.

### Financial support and sponsorship

Hyderabad Eye Research Foundation, Hyderabad, Telangana, India. The funders had no role in the preparation, review or approval of the manuscript.

### Conflicts of interest

There are no conflicts of interest.

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## References

- Honavar SG. SOS=Save our surgeons (from succumbing to stress)!. Indian J Ophthalmol 2021;69:2245-6.
- Miller KM, Keener GT. Stretch pupilloplasty for small pupil phacoemulsification. Am J Ophthalmol 1994;117:107-8.
- Christou CD, Tsinopoulos I, Ziakas N, Tzamalidis A. Intraoperative floppy iris syndrome: Updated perspectives. Clin Ophthalmol 2020;14:463-71.
- Malyugin B. Small pupil phaco surgery: A new technique. Ann Ophthalmol 2007;39:185-93.
- Bhattacharjee S. B-HEX pupil expander: Pupil expansion redefined. Indian J Ophthalmol 2017;65:1407-10.

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Access this article online	
Quick Response Code:	Website: www.ijo.in
	DOI: 10.4103/ijo.IJO_2248_21

Cite this article as: Murthy SI. Commentary: Pupil expansion devices: A boon for safe cataract surgery in small pupils. Indian J Ophthalmol 2021;69:2694.