

Five Pearls for the Perfect Preoperative Examination

Perhaps the most important component is assessing macular function.

BY JÉRÔME C. VRYGHEM, MD

Counseling the occasional unhappy patient after ophthalmic surgery is sometimes inevitable. However, the more successful you are at preoperative planning, the less likely you are to end up in this situation. A thorough preoperative work-up, including well-documented preoperative examinations, is the blueprint for creating happy patients and minimizing postoperative complaints.

Preoperative assessment is time-consuming but necessary to ascertain the patient's history, eliminate any procedures that would not work for the patient, and establish goals for the chosen procedure. A thorough explanation of the options for treatment and their limitations will help the patient to make an educated decision, promote better compliance, and save time later. Below are my top five pearls for conducting the perfect preoperative examination for patients undergoing cataract surgery, refractive lens exchange, refractive surgery, and surgery for keratoconus.

FIVE PEARLS

No. 1: Perform a macular function test. Potential visual acuity measurements must be performed to determine if cataract surgery will produce visual improvement. I have developed an inexpensive measurement, the Vryghem Macular Function Test, which achieves 94.2% sensitivity and 32.4% specificity, and has positive and negative predictive values of 99.2% and 24.3%, respectively.¹⁻³

For this test, a Parinaud near reading chart (Figure 1), an 8.00 D trial lens, and a Heine ophthalmoscope (Heine Optotechnik, Herrsching, Germany) are used. The patient has best correction plus 8.00 D in the trial frame, and the letter chart is positioned approximately 12 cm

from the trial lens. The patient reads the chart while the lines are illuminated with the ophthalmoscope. Patients who can read the smallest numbers on the chart (grade Parinaud 1) are given a positive score, which assumes good macular function and probability for good visual outcomes after cataract surgery. Those who cannot read the smallest line are given a negative score, which assumes that their BCVA will be worse than 20/30 and that outcomes after cataract surgery may be poor. In patients with dense cataract who are not able to read the smallest line, the test has no negative predictive value.

No. 2: Take astigmatism into account. Preoperative examinations for cataract surgery and refractive lens exchange should include keratometry measurements. With the latest generation of multifocal IOLs such as the ATLISA (Carl Zeiss Meditec, Jena, Germany), the Lentis Mplus (manufactured and distributed by Oculentis GmbH, Berlin; and Topcon, Rotterdam, Netherlands), and the FineVision Micro F (Physiol, Liège, Belgium), exact keratometry is essential to ensure obtaining emmetropia and eliminating astigmatism. Such lenses function properly only if astigmatism has been completely eliminated. I also suggest microincision cataract surgery for implantation of these IOLs because of its astigmatic neutrality.

If the patient wears glasses, I compare the preoperative refraction with the preoperative keratometry, ensuring that at least two measurements are taken with the ARK Autorefractor/Keratometer (Nidek, Gamagori, Japan) and five measurements with the IOLMaster (Carl Zeiss Meditec). Placido-disc-based topography is used to detect asymmetric astigmatism. If the results indicate a small amount of against-the-rule astigmatism (less than 1.25 D), I perform arcuate keratotomy with the Mastel Arcuate Corneal Compass (MACC; Mastel, Rapid City,

MACULAR FUNCTION TEST

Developed and designed by Jérôme C. Vryghem, M.D.

OD	OS
870 869 85 1000 867 865 81 865 867 86 862 860	
842 847 8 87 100 880 74 9 202 91 96 3884	
50 8 32 97 234 85 2 70 184 32 5 87	
12 764 8963 10 6022 598 9	43 2758 6 397 1884 25 735
609 9047 532 188 614	43 2758 6 397 1884 25 735
943 25 68 174 823	859 24 8 367 3 75 42
83 29 808 3795	859 24 8 367 3 75 42
578 1 64 39	68 195 74 26 2
29 360 875	76 3 27 645
	508 43 216

Interpretation of the test

Only if the patient is able to read Parinaud 1 (MF+) is it presumed that his/her eye has a good macular function and that good visual results will be obtained after cataract surgery. This test is of no value without a thorough pre-operative clinical examination of the eye.

Post-op BCVA (n=396)	>20/30	>20/25
Positive predictive value	99,2%	94,2%
Negative predictive value	24,3%	32,4%
Sensitivity	92,7%	93,1%
Specificity	75,0%	36,4%

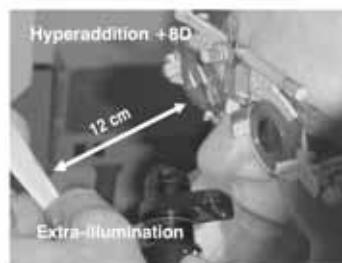
Ref. Vryghem et al., Predicting cataract surgery results using a macular function test. J. Cataract Refract Surg. (2004) 30: 2349-2353

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PARINAUD	SNELLEN	DECIMAL
1	20/20	10/10
1,4		7/10
2	20/40	5/10
3	20/63	3,3/10
4	20/80	2,5/10
5	20/100	2/10
6	20/125	1,7/10
7		1,4/10
8		1,25/10

How to use the Vryghem Macular Function Test ?

- Each eye has to be tested separately. Invite the patient to read the chart with - in the trial lens - his/her best correction for long distance, plus a hyperaddition of +8 diopters. The chart is held about 12 cms away from the trial lens but the patient may adjust this distance for him/herself. Highlight the line you want the patient to read with the spotlight of an ophthalmoscope.
- Repeat the test after pupil dilation in case of posterior subcapsular or dense nuclear cataract.



PUPIL GAUGE (mm)

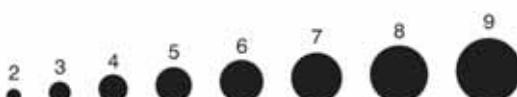


Figure 1. The Parinaud near reading chart (left) is an essential component of the Vryghem Macular Function Test.

South Dakota). If the patient has higher astigmatism, I use a toric or toric multifocal IOL, paying attention to proper alignment and centration.

No. 3: Budget extra chair time. It is extremely important to assess the visual needs of the patient before cataract surgery or refractive lens exchange. Take time to get to know your patient well. Is he or she professionally active, using the computer and driving a lot, or is he or she an older patient with less visually demanding needs? Is the patient a perfectionist or someone who is ready to cope with issues such as the unbalanced postoperative vision of monovision or the possible side effects of multifocal IOLs—loss of contrast sensitivity, halos, and double vision?

Give careful thought to the patient's requirements for near vision and his or her financial situation and occupa-

tion. If a younger patient does computer work, we recommend the Lentis Mplus or the FineVision Micro F; for older patients who like to read, we recommend the AT.LISA or the FineVision. If the patient is not ready to pay for multifocal IOLs, we suggest monovision. However, if amblyopia is detected, monovision will not work. In patients who drive for a living or who are commercial pilots, we use monofocal IOLs, targeting both eyes for distance. Lastly, we find that patients with myopia are usually more difficult to satisfy than those with hyperopia.

One important message to relay is that 4% to 5% of patients will require LASIK fine-tuning for residual spherical or astigmatic error. The patient should also understand that any postoperative treatments will carry an extra cost.

No. 4: Detect form fruste keratoconus. This pearl



FIVE PEARLS FOR PATIENT SELECTION

BY RUDY M.M.A. NUIJTS, MD, PhD

No. 1: When counseling patients for premium IOLs, perform corneal topography. Ensure that the patient has refrained from contact lens wear for an appropriate time before performing ocular biometry. Corneal topography alleviates the risk of implanting a premium IOL in patients with form fruste keratoconus, which is more prevalent than many surgeons think. This combination may have consequences with respect to quality of vision postoperatively. Also, use aberrometry to evaluate coma and trefoil when irregular astigmatism is suspected.

No. 2: Incorporate anterior chamber imaging techniques. Such imaging is crucial to evaluate the suitability of phakic IOL implantation. We now know that only measuring central anterior chamber depth is insufficient to warrant long-term safety of phakic anterior chamber IOLs. The distance of the IOL's peripheral edge to the endothelium is the largest determining factor of long-term endothelial safety.

No. 3: Consider using multiple measurements with various technologies. This strategy may be helpful to detect corneas at risk for ectasia after corneal laser surgery. If in doubt, do not treat and plan for sequential measurements to look for progression and/or change over time. There is no need to hurry the treatment.

applies to refractive surgery. Both Placido-based and elevation topography systems should be used to detect form fruste keratoconus. The surgeon can select from the Keratograph (Oculus Optikgeräte GmbH, Wetzlar, Germany), the Topolyzer (Alcon Laboratories, Inc., Fort Worth, Texas), the Pentacam (Oculus Optikgeräte GmbH), the Oculyzer (Alcon Laboratories, Inc.), and the Orbscan (Bausch + Lomb, Rochester, New York).

Do not forget the basics:

(1) Eliminate the effect of warpage due to contact lens wear by asking patients to discontinue soft contact lens use for at least 5 days or hard lenses for at least 3 weeks;

(2) Look for asymmetric astigmatism (with a kink in

TAKE-HOME MESSAGE

- A thorough preoperative work-up including preoperative examinations is key to minimizing patient complaints.
- Budget extra chair time.
- Give careful thought to the patient's requirements for near vision, and consider his or her financial situation and occupation.
- When in doubt, repeat topography.

No. 4: Do not push presbyopia-correcting IOLs when counseling patients. Selecting the appropriate IOL for the patient is a crucial preoperative step. The patient and the patient's family must have realistic expectations and understand the potential risks and long-term effects of each specific lens. This is still an issue in the second opinions I treat after the patient is dissatisfied with his or her multifocal IOL.

No. 5: Always examine the patient yourself before surgery. It is ill advised to perform surgery on patients who have been solely counseled by optometrists. Patient contact before surgery is absolutely necessary to establish a confident patient-doctor relationship. This may be crucial, especially in those cases where an unexpected and suboptimal postoperative outcome occurs.

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the axis), especially with thin corneas;

(3) Note whether the thinnest point of the cornea is off-center;

(4) Check the keratoconus indices of all the topography systems you use, but do not trust them completely;

(5) Account for preoperative astigmatism; in eyes with high regular astigmatism, the posterior elevation map can mimic form fruste keratoconus;

(6) Repeat topography measurements in case of doubt; and

(7) Note that none of the points mentioned above is an absolute indication of form fruste keratoconus.

When evaluating the surface of the cornea, take into account that dryness can affect measurement with Placido-disc-based systems. When no dryness is present, the images are more trustworthy than with elevation-based systems, and for this reason I prefer Placido-disc topography-guided treatments. Additionally, posterior elevation maps are important when using elevation topography systems; consider the recommendations of the topography system manufacturers. With the Orbscan, use the normalized map; with the Pentacam, check the progression of corneal thickness.

No. 5: Consider the patient's age. When you are consid-

ering corneal collagen crosslinking with ultraviolet light (UV-CXL) for patients with thin corneas, base your strategy on the patient's age. If he or she is younger than 25 years, keratoconus is more likely to progress, whereas it is more likely to remain stable if the patient is at least 35 years old.

If the patient has keratoconus, is younger than 25 years, and tolerates contact lenses, the best course of action is to assess his or her progression. Suggest UV-CXL only if progression has been demonstrated.

If the patient has keratoconus and is contact lens intolerant, especially if the patient is older, I suggest surgical visual rehabilitation techniques as follows: topography-guided surface treatment combined with UV-CXL in cases of low ametropia or astigmatism, and implantation of (toric) phakic IOLs such as the Artisan or Artiflex (Ophtec GmbH, Groningen, Netherlands) in cases of higher ametropia or astigmatism. I recently added intrastromal corneal ring segments, implanted in femtosecond-laser-made tunnels, to my therapeutic arsenal for eyes with medium or high ametropia and astigmatism. I use this technology in patients who want to avoid the risks of an intraocular procedure. The latter is performed after UV-CXL in cases of progressive keratoconus. However, in my early experience, the refractive result seems to be less predictable than with phakic IOLs. ■

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Editor's Note: To obtain the Vryghem Macular Function Test, send a request to info@vryghem.be.

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