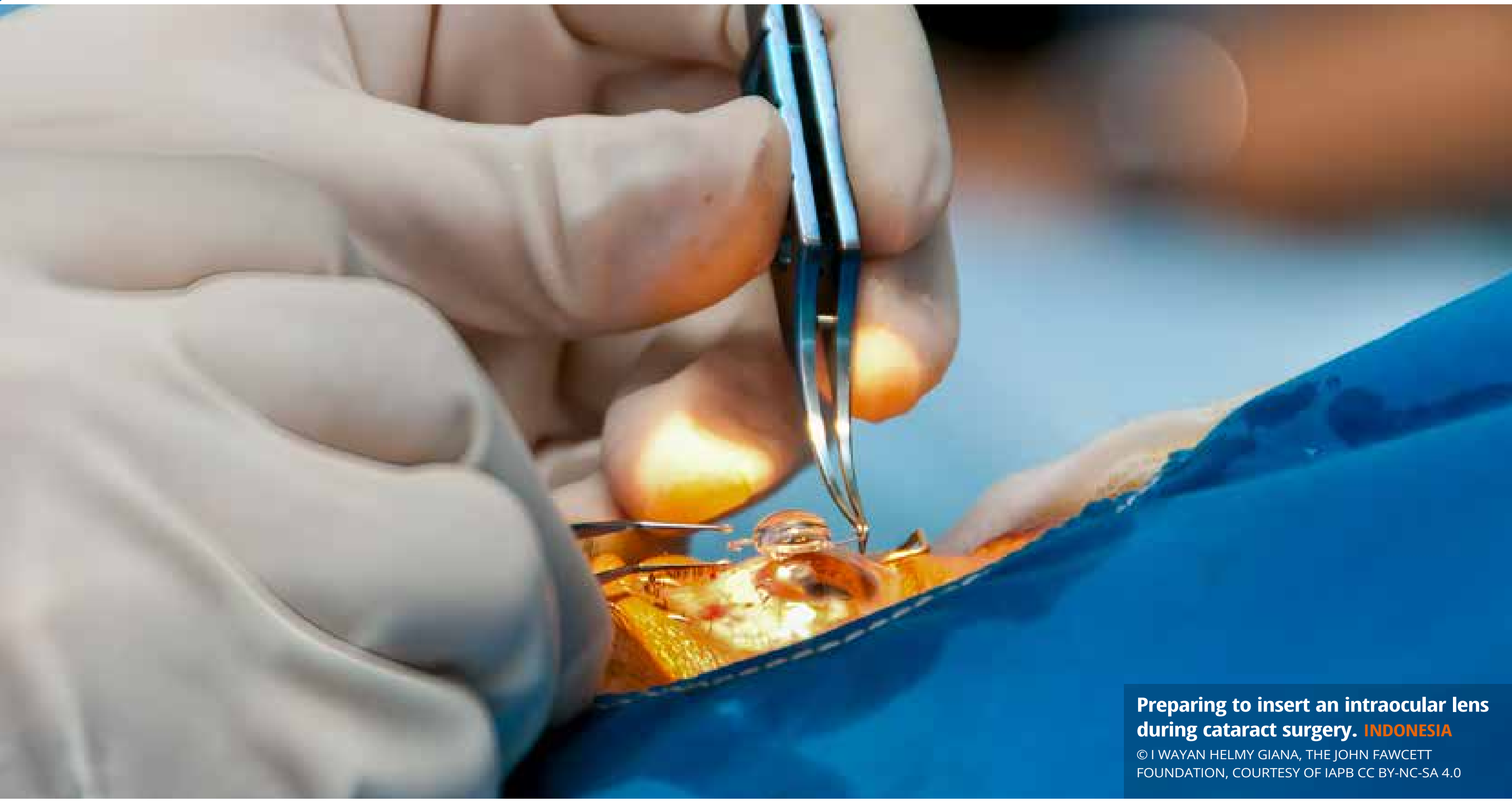
Community Eye Health Journal

VOLUME 38 • NUMBER 128 • 2025

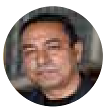
South Asia Edition



Preparing to insert an intraocular lens during cataract surgery. INDONESIA
© I WAYAN HELMY GIANA, THE JOHN FAWCETT FOUNDATION, COURTESY OF IAPB CC BY-NC-SA 4.0

Cataract: optimising and monitoring surgical outcomes

Improving surgical technique, monitoring, and pre- and postoperative examination ensures a future where cataract surgery is not just widely available, but also effective, equitable, and trusted.



Lila Raj Puri
Medical Advisor, Asia: The Fred Hollows Foundation, London, UK.

Cataract remains the leading cause of blindness worldwide, disproportionately affecting people in low- and/or middle-income countries. In recent decades, significant progress has been made in scaling up cataract surgical services, leading to remarkable increases in surgical volumes. However, surgical numbers alone do not equate to improved visual outcomes or quality of life. As discussed in our previous issue (volume 38, issue 127) poor refractive outcomes after surgery undermine community trust, discourage service uptake, and waste already limited resources.

For patients, the difference between 'sight restored' and 'sight compromised' can be the difference between independence and disability. With today's techniques, including manual small incision cataract surgery (MSICS) and phacoemulsification, the goal must be to optimise outcomes, ensuring that every patient, regardless of setting, receives safe, high-quality care.

The changing landscape of cataract surgery

Modern cataract surgery has moved away from large-incision extracapsular extraction, which required sutures, to sutureless small-incision and phacoemulsification techniques. Phacoemulsification, with its precision, rapid recovery, and excellent refractive predictability, has become the standard of care in high-income and urban settings.[1] However, the benefits of phacoemulsification come with prerequisites: costly equipment and the need

About this issue

Communities expect and deserve good-quality vision after surgery. By focusing on preoperative evaluation, safe, standardised surgical practice, meticulous postoperative management and follow-up, and continuous audit with constructive feedback, eye care teams can ensure that every cataract operation delivers lasting visual improvement.

Contents

for reliable electricity, high-quality consumables, and extensive training. In resource-limited environments, these requirements can make phacoemulsification impractical or unsustainable at scale.

In contrast, MSICS provides a significantly more cost-effective alternative. When performed with skill and precision, MSICS achieves outcomes comparable to phacoemulsification, even in advanced or brunescent cataracts, where phacoemulsification may pose additional risks.[1,2] Its adaptability, speed, and resilience to infrastructural limitations make MSICS the most appropriate technique for large-scale blindness prevention in lower-resource settings.

In this issue, we focus on the following key components of cataract surgical quality: preoperative assessment, surgical performance – with a focus on MSICS surgery – monitoring and auditing, and postoperative examination. Only by embedding quality at every stage can eye health programmes ensure long-term trust in cataract services and achieve the vision of effective Cataract Surgical Coverage (eCSC) – thereby contributing to the elimination of avoidable blindness.

Preoperative assessment

The risk of surgical complications can be minimised if cataract teams carry out a thorough preoperative assessment and assign a surgeon with the appropriate level of experience. Such preparation reduces intraoperative surprises, improves patient understanding, and ensures smoother postoperative recovery.[1] Yet, in many lower-resource settings, this step is either rushed or inadequately performed due to patient load or resource constraints.

Coexisting ocular conditions, such as corneal scarring, glaucoma, uveitis, or retinal pathology, should be identified preoperatively, as these may affect prognosis. Patients should also receive counselling about postoperative expectations, medications, and follow-up.

Quality considerations during surgery

The surgical act is where the greatest opportunity lies to secure a good visual outcome. Good outcomes depend on meticulous preoperative evaluation, patient counselling, accurate biometry for all patients, an effective infection control policy, skilful surgical execution, and good postoperative management

Community Eye Health Journal
VOLUME 38 • NUMBER 128 • 2025
South Asia Edition

INTERNATIONAL CENTRE FOR EYE HEALTH

LONDON SCHOOL of HYGIENE & TROPICAL MEDICINE

IAPB

and follow-up. Critical quality considerations during surgery should include adherence to aseptic protocols, consistency in surgical technique through standardised surgical protocols, and continued training (especially for junior surgeons), skills development and mentorship, and the use of appropriate technique.

Even with the best systems, complications are inevitable. The measure of a high-quality service is not whether complications occur, but how effectively they are managed. This should include immediate recognition and management, training surgeons to recognise complications such as posterior capsule rupture or vitreous loss, and equipping facilities with the necessary instruments and consumables for safe management. For complications beyond a surgeon's capacity, timely referral to higher-level centres must be streamlined.

Postoperative follow-up: closing the loop

Surgery does not end when the last suture is tied or the wound is sealed. Postoperative follow-up is essential for the early detection and management of complications such as corneal oedema, raised intraocular pressure (IOP), or infection. It is also an opportunity to remind patients about returning for follow-up visits and the importance of adhering with medication and guidance. Ultimately, follow-up ensures optimal visual rehabilitation and better patient satisfaction.

Follow-up should be structured: a review on day 1 to check wound integrity and IOP, a visit at around 1 week to monitor healing, and an appointment for refraction at 4–6 weeks. However, many cataract programmes discharge patients after one or two days, with limited follow-up due to travel difficulties or resource constraints. Community-based models such as outreach follow-up, collaboration with primary health workers, or the use of teleophthalmology, can bridge gaps in these settings.

Surgical outcome monitoring and auditing

The measure of success is not the number of operations performed, but the quality of sight restored.

In lower-resource settings, implementing surgical auditing systems is often resisted due to concerns about workload, fear of judgment, or a lack of infrastructure. However, without objective measurement, quality cannot be improved.

An effective auditing system includes routine data collection for every operation, constructive feedback to the surgical team, benchmarking against international standards, and integration with national programmes to ensure accountability. Cataract surgical outcome monitoring (CSOM) is one example of an auditing system. It involves routine documentation of intraoperative events and visual outcomes. Establishing CSOM systems allows services to identify performance gaps and design targeted training or improvement of processes.

Regular reviews of the data help identify individual or institutional performance gaps. It also facilitates comparison with global benchmarks, such as the World Health Organization's recommendation that at least 80% of operations achieve presenting visual acuity of 6/12 or better at 4–12 weeks after surgery.[2]

All audits should be conducted in an environment that is focused on learning, not punishment. When they are shared transparently, audits can build a culture of excellence and confidence among surgical teams.

Conclusion

Cataract surgery in lower resource settings has moved beyond the era of 'surgery at any cost.' Communities now expect and deserve good-quality vision after surgery. Community-based programmes should prioritise not just high-volume but also high-quality surgery, ensuring long-term trust in cataract services. By focusing on preoperative evaluation, including basic ocular examination and IOL power calculation; safe, standardised surgical practice with adherence to asepsis; meticulous postoperative management and good follow-up; and continuous audit with constructive feedback, eye care programmes can ensure that every cataract operation delivers lasting visual improvement. This allows cataract programmes in low-resource settings to move towards a future where cataract surgery is not just widely available, but consistently effective, equitable, and trusted.

References

1 Khanna RC, Marmamula S, Krishnaiah S, Giridhar P, Chakrabarti S, Rao GN. Changing trends in the prevalence of blindness and visual impairment in a rural district of India: systematic observations over a decade. Indian J Ophthalmol. 2012;60(5):492-497. doi:**10.4103/0301-4738.100560**

2. Gogate PM, Kulkarni SR, Krishnaiah S, et al. Safety and efficacy of phacoemulsification compared with manual small-incision cataract surgery by a randomized controlled clinical trial: six-week results. Ophthalmology. 2005;112(5):869-874. doi:**10.1016/j.ophtha.2004.11.055**

Subscribe
Visit **https://bit.ly/3uwMvf5**

Address for subscriptions
Community Eye Health Journal South Asia Edition,
Pragyaan Sustainable Health Outcomes (PRASHO),
Floor 2, Kapil Kavuri Hub, no. 144
Survey 37, Financial District,
Nanakramguda, Telangana 500032.
Email **editor@cehjsouthasia.org**

Correspondence articles
We accept submissions of 800 words about readers' experiences in eye health. Contact:
editor@cehjsouthasia.org

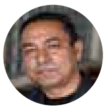
Published by the International Centre for Eye Health, London School of Hygiene & Tropical Medicine.

ISSN 0953-6833

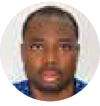
The *Community Eye Health Journal* is supported by:

South Asia Edition supported by:

Andrew Blaikie
Senior Lecturer, University of St Andrews, Scotland, UK.



Lila Raj Puri
Medical Advisor, Asia: The Fred Hollows Foundation, London, UK.



Louis Oteng-Gyimah
Medical Director/ Ophthalmologist in charge: Anglican Eye Clinic, Jachie, Ashanti Region, Ghana.

Assessing cataract patients at the treatment centre and allocating the right surgeon

A well-structured preoperative process minimises intraoperative surprises and improves surgical outcomes.

Patients referred from community or primary eye care centres for cataract surgery require systematic evaluation before surgery. The aim is to confirm the diagnosis, rule out contra-indications, grade the surgical complexity, and ensure the patient is ready for surgery. A well-structured preoperative process minimises intraoperative surprises and improves surgical outcomes.

Preoperative evaluation of a patient before cataract surgery. INDIA

A cataract diagnosis should not rely solely on lens opacity, but vision must correlate with cataract density and no other pathology. It is helpful to identify patients unlikely to benefit fully from surgery due to coexisting disease of the front or back of the eye.

Figure 1 Anterior segment comorbidities and/or risk factors for challenging cataract surgery: **A.** Pupil with synechia **B.** Hazy cornea **C.** Phacodenesis **D.** Dislocated lens in anterior chamber **E.** Previous trabeculectomy **F.** Previous complicated cataract surgery **G.** Posterior polar cataract **H.** Pseudoexfoliation.

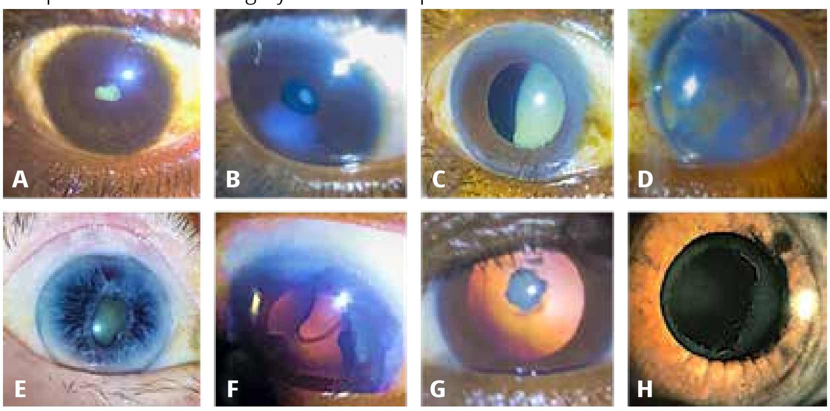


Figure 2 Dilated fundal reflex examination to check for the presence and type of cataract. **A.** Clear media – no cataract. **B.** Nuclear cataract. **C.** Cortical cataract. **D.** Posterior subcapsular cataract.

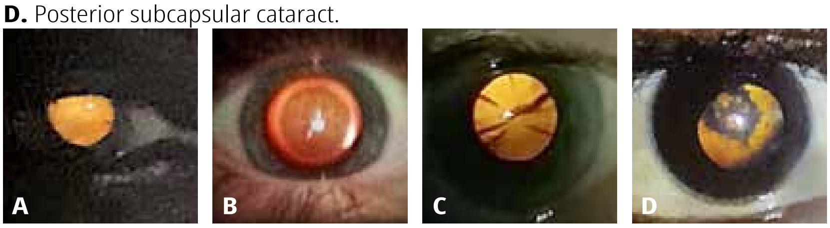
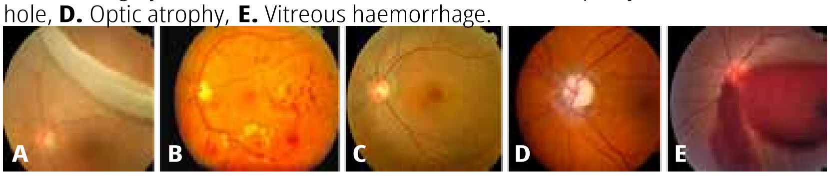


Figure 3 Posterior segment comorbidities and/or risk factors for challenging cataract surgery: **A.** Retinal detachment, **B.** Diabetic retinopathy, **C.** Macular hole, **D.** Optic atrophy, **E.** Vitreous haemorrhage.



Assessment: the steps

Record each patient's name and phone number and the details of the person or centre responsible for referring them. It is helpful to let the referral centre or person know the names of everyone who attended, so they can follow up with those who haven't. This improves continuity of care, and it is also an opportunity to give feedback about the accuracy of each referral.

Take a careful history, focusing on the impact of vision loss on activities of daily living, previous ocular surgery or trauma, the history of systemic diseases (diabetes, hypertension, bleeding disorder, etc.) and current medications.

Assess visual acuity for distance and near, both unaided and with a pinhole, for both eyes. This establishes baseline vision and confirms the impact of cataract on visual function. Carry out refraction if vision improves with pinhole or when media clarity allows.

Assess the **intraocular pressure**.

Before dilation, **check pupil response** (constriction to a bright light in a dim room).

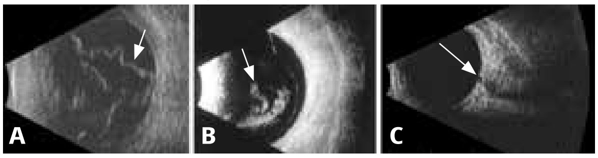
Examine the **anterior segment** using a slit lamp to evaluate the eyelids, conjunctiva, and cornea (to check clarity and identify any disorders), the anterior chamber depth, and the cataract density and type.

Check for **comorbidities and/or risk factors**; for example: a pupil with synechia, a hazy cornea, phacodenesis (movement of the lens due to lack of zonular support), a dislocated lens in the anterior chamber, a previous trabeculectomy, previous complicated cataract surgery, posterior polar cataract, and pseudo-exfoliation (Figure 1 A–H).

After dilation, record the size of the pupil and examine the **fundal reflex** for the presence and type of cataract (Figure 3).

Check for any **comorbidities of the posterior segment**, such as retinal detachment, diabetic retinopathy, macular hole, optic atrophy, or vitreous

Figure 4 B-scan showing posterior segment pathology: **A.** Retinal detachment **B.** Vitreous haemorrhage **C.** Optic disc cupping.



haemorrhage (Figure 3 A–E).

If the **fundus view is obscured**, especially if the initial pupil constriction to bright light was abnormal, perform a **B-scan** to rule out disease at the back of the eye (Figure 4 A–C).

Making a decision: operate now, defer, or offer alternative management

Operating on patients that have other active disease or causes of visual impairment can lead to poor outcomes. This can potentially serve as bad publicity in the community and discourage other people with cataract, who could benefit from surgery, from attending.

Deciding whether a patient with cataract should undergo surgery immediately, be advised to defer surgery, or receive alternative management, is a critical step in cataract care. This decision must balance visual needs, ocular and systemic risk factors, patient expectations, and service capacity. While cataract surgery remains the definitive treatment for visually significant lens opacity, not every patient referred for surgery is ready or suitable at that moment. The evaluation process should therefore aim to identify those who will benefit most from timely intervention, those who require stabilisation or further investigation/treatment before surgery, and those for whom non-surgical or low-vision care is more appropriate.

Patient preference, general health, and the presence of other ocular diseases should also be considered before making the final decision.

We suggest the following criteria.

1. Operate now

Operate now if:

- The vision loss is due to cataract rather than another eye condition
- The cataract is significantly affecting the person's quality of life, such as difficulty reading, driving, or performing routine tasks
- There are no contraindications, such as active infection, uncontrolled systemic illness, or ocular inflammation
- The patient is willing to accept surgery, understands the risks and benefits, and gives informed consent.

If the decision is to go ahead with cataract surgery, the next step is biometry, including axial length and keratometry, to calculate the intraocular lens (IOL) power to ensure postoperative refractive predictability and patient satisfaction.

Carry out a systemic assessment, checking blood pressure, blood sugar, and overall suitability for local anaesthesia to minimise the risk of complications during surgery. Offer advice on blood sugar management if levels are high.

Discuss as realistic visual prognosis with the patient, especially if comorbidities present, and the choice of IOL (see **bit.ly/43RJh8m**). Talk about the anaesthesia plan, the need for someone to accompany them, the direct and indirect cost considerations, and the postoperative follow-up, medication and schedule.

2. Defer surgery

Defer surgery if:

- There are other active eye conditions. These need to be treated first, e.g. conjunctivitis, corneal infection, active inflammation, advanced diabetic retinopathy, or another posterior segment disease causing vision impairment
- The cataract is immature, and vision can be adequately corrected with glasses. Tell the patient to return if they start to struggle with activities of daily living
- The patient suffers from uncontrolled systemic illness (e.g., severe hypertension, hyperglycaemia, cardiac instability). These need to be controlled first.

3. Offer alternative management

Offer low vision and rehabilitation support to patients with advanced glaucoma (end-stage glaucoma), visually significant corneal scarring, or advanced age-related macular degeneration. Take time to explain to them why cataract surgery will not improve their vision.

Case complexity grading: who should operate?

Surgical complications, due to inexperienced surgeons operating on eyes with complex cataracts, can also result in disappointing patient outcomes. This can potentially also serve as bad publicity. Grading the difficulty of the operation based on the nature of the eye and patient, and identifying an appropriate surgeon based on seniority/experience to operate, is therefore important. Case allocation optimises outcomes, builds progressive surgical competency, and reduces complication rates. The following can aid as a guide in this process.

Junior trainee, with supervision. Catarat with good dilation, emmetropic eye, no pseudoexfoliation or Fuch's dystrophy, easy access to the eye, with a healthy fellow eye, in a cooperative patient with minimal/no comorbidities.

Senior trainee, with indirect supervision. Mature cataract, small pupil, pseudoexfoliation with minimal phacodonesis, mild Fuch's dystrophy, relatively cooperative patient with acceptable access to eye.

Experienced senior consultant. Small pupil, hypermature/brunescent lens, pseudoexfoliation with obvious phacodenesis or subluxation, history of eye surgery or trauma, corneal scar obscuring view, high myopia or hypermetropia, only one good eye, or a very deep-set eye with a prominent brow.

Anterior vitrectomy

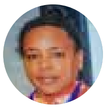
Every cataract centre must ideally be equipped with an anterior vitrectomy system, and every cataract surgeon, irrespective of their speciality, must know how to do a good anterior vitrectomy. This reduces the incidence of retinal detachment dramatically. In addition, if there is vitreous haemorrhage or obvious coexistent proliferative diabetic retinopathy, then combined cataract extraction, vitrectomy, and laser in a tertiary centre is preferred.

References

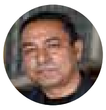
1 Kousha O, Blaikie A. The Arclight and how to use it. Community Eye Health. 2019;32(107):50-51. **bit.ly/cehj85**

2 Devanesam Y, Rajaram SK. Engaging with communities to generate demand and improve the uptake of eye care. Community Eye Health J. 2022;35(115):8-10 **bit.ly/cehj230**

3 O'Carroll V, Sagahutu JB, Ndayambaje D, et al. Evaluation of a pilot interprofessional Arclight™ workshop for healthcare students in Rwanda: promoting collaborative practice in eye health. J Interprof Care. 2021;35(4):637-640. doi:**10.1080/13561820.2020.1782356**



Mihret Deyesa Kabeta
Senior Ophthalmologist: Ambo General Hospital, Oromia Region, Ambo, Ethiopia.



Lila Raj Puri
Medical Advisor, Asia: The Fred Hollows Foundation, London, UK.

Manual small-incision cataract surgery (MSICS): techniques and tips to optimise outcomes

Each step of the MSICS procedure needs to be carried out with great focus and precision in order to ensure a successful outcome.

Manual small-incision cataract surgery (MSICS) is one of the most common surgical procedures in ophthalmology. It involves several steps, and each step needs great focus to ensure a successful procedure and optimal outcomes. The tips and tricks in this article describe how to optimise MSICS techniques in order to get better uncorrected vision, faster recovery, and fewer complications.

Anaesthesia

Most cataract operations are performed under local anaesthesia. Peribulbar or retrobulbar anaesthesia is commonly used. Other techniques, like sub-Tenon's injection, or subconjunctival injection supplemented with intracameral injection, are also used. The overall goal should be to achieve analgesia (absence of pain) and akinesia (absence of eye movement); both are essential for patient comfort and to allow the surgeon to perform delicate procedures safely.

Preparing the eye for surgery

- Confirm the details of the patient, the intraocular lens (IOL) power, and other information (such as the site and type of procedure) using the preoperative checklist
- Clean the periocular skin and surrounding area using 5% povidone-iodine
- Instil povidone-iodine 5% drops in the conjunctival sac
- Place a sterile eye towel or adhesive drape over the eyelashes and lid margins to isolate them from the surgical field.

Conjunctival peritomy

- A fornix-based conjunctival flap is usually made at the superior limbus (between 10 and 2 o'clock) However, depending upon the clinical indication, the surgeon's skill, and the patient's astigmatism status, a temporal conjunctival peritomy may have to be done
- Tenon's capsule should be dissected clearly from the incision area
- Apply minimal cautery (preferably wet field) to achieve haemostasis.

Incision

This is one of the most critical steps of MSICS and determines how easy it will be to deliver the nucleus, as well as the degree of postoperative astigmatism.

The incision size is determined by the type of cataract and size of the nucleus. For example, the extraction of immature cataracts in younger patients may only require a small tunnel, but very big brown nuclei require a larger tunnel.

An incision size of 6–7 mm should be adequate. Longer incisions produce more flattening and lead to against-the-rule astigmatism. The incision should be 1.5–2.0 mm away from the limbus, as posterior incisions decrease against-the-rule astigmatism.

There are different types of incision practiced by eye surgeons, e.g. smile, straight, frown, Blumenthal with side cuts, and chevron V incision. Studies, and our experience, have shown that astigmatism is minimised when using a **frown-shaped incision** (Figure 1) and a **chevron V** incision.

Figure 1 Making a frown-shaped incision

Scleral tunnel construction

- Construct the scleral tunnel using a sharp crescent blade (Figure 2). It should extend approximately 1.0–1.5 mm into the cornea.
- Carry out the dissection towards the limbus on both sides to create a funnel-shaped 'pocket', maintaining a uniform depth of approximately 50% of scleral thickness. This is because a too-shallow incision can cause buttonholing and a too-deep incision can cause premature entry. Be careful not to cut the limbus on either side.
- Create side pockets at the ends to enlarge the internal opening, especially when delivering a large nucleus.
- Keep the tunnel 'shelved', with the external opening smaller than the internal, to maintain the valve effect.

Figure 2 Formation of the scleral tunnel

Entry into anterior chamber

- Use a 3.2 mm keratome with a sharp tip to enter the anterior chamber, as a blunt tip may cause detachment of Descemet's membrane. Check the tip before using it.
- Enter through the internal corneal lip of the tunnel, and follow the corneal plane up to 1.5–2.0 mm before changing direction towards the anterior chamber. If the anterior chamber is entered before the corneal lip is reached, then the valve effect is lost and a suture will be required at the end of the surgery. The internal opening is usually 8–10 mm larger than the external scleral incision.
- Take care not to dissect too far towards the anterior during scleral tunnel creation and internal incision extension, as it can lead to injuries to the iris or ciliary body, causing them to bleed. During and after preparing the tunnel, maintain pressure in the anterior chamber using viscoelastic.

Side-port incision

Create a separate small side-port (paracentesis) using a keratome or 15-degree knife. This is needed for the introduction of the second instrument for irrigation aspiration, IOL dialling, injection of viscoelastics, capsulotomy, removal of subincisional cortex, intracameral injection, and anterior chamber reformation at the end of surgery. Again, ensure the tip of the keratome or 15-degree knife is sharp and not bent; this will help to avoid detachment of Descemet's membrane. The ideal size of the side-port incision is around 1.5 mm. The size is important, as a too-small incision creates difficulty during instrument manipulation and capsulotomy, and too-large incision may lead to instability of the anterior chamber and problems during anterior chamber formation at the end of surgery.

Capsulotomy

Improper capsulotomy may lead to uncontrolled capsular tear extension, posterior capsule rupture, vitreous loss, IOL decentration, IOL drop, and even nucleus drop during hydroprocedure.

The best capsular opening is a **continuous curvilinear capsulorhexis (CCC)**, as it will guarantee long-term, 'in the bag' IOL centration (Figure 3). However, in mature and hypermature cataracts, and in intumescent cataracts, the **envelope technique** is preferable due to the safety it provides to the corneal endothelium during nucleus delivery. Other techniques may be needed, depending upon the pupil size, nucleus size, the experience of the surgeon, and the availability of instruments.

Figure 3 Continuous curvilinear capsulorhexis

It is always advisable for less experienced surgeons to use tryphan blue to stain the capsule before carrying out the capsulotomy, as this makes it easier to see the shape of the capsule and avoid extension into the posterior capsule.

The size of the capsulotomy should be 5–6 mm. If the capsulorrhexis is small and an attempt is made to deliver a large nucleus through the small opening, zonular dialysis and zonular rupture is likely.

Maintaining the anterior chamber throughout the procedure with liberal use of viscoelastic is crucial for better outcomes.

> **"It is always advisable for less experienced surgeons to use tryphan blue to stain the capsule before carrying out the capsulotomy."**

Hydroprocedure

Good hydrodissection is very important to achieve nucleus mobility and avoid prolapse of the anterior chamber.

- Form the anterior chamber with cohesive viscoelastics but leave a small egress path (don't trap fluid)
- Position the cannula between the capsule and nucleus
- Give small, pulsed injections of fluid and gentle decompression. It is advisable to do multi-quadrant hydrodissection
- In posterior polar, traumatic, mature, and hypermature cataracts, perform hydrodissection gently and gradually to avoid complications like zonular dialysis, capsule tear, capsulotomy extension, and nucleus drop
- At the end of the procedure, rotate the nucleus gently to confirm mobility (Figure 4).

Nucleus delivery

The basic principle is to take out the nucleus from the capsular bag and main wound without damaging the corneal endothelium and capsule.

- Check the size of the tunnel (Figure 5). If the incision is too small for nucleus delivery, slightly enlarge the tunnel to prevent undue stress on the zonules, rotation or flipping of the nucleus, and corneal endothelial touch.
- Once a pole or nucleus is out, visco-coat the endothelium, then complete the nucleus delivery via your preferred method (such as visco expression, irrigating Vectis, fishhook technique, Simcoe cannula, or hydro expression).
- Use viscoelastic to form the anterior chamber, push the iris, and prevent the nucleus from touching the corneal endothelium.

Figure 4 Mobilising the nucleus before lifting it into the anterior chamber

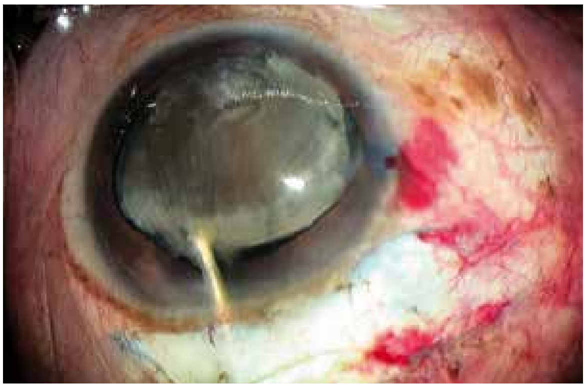
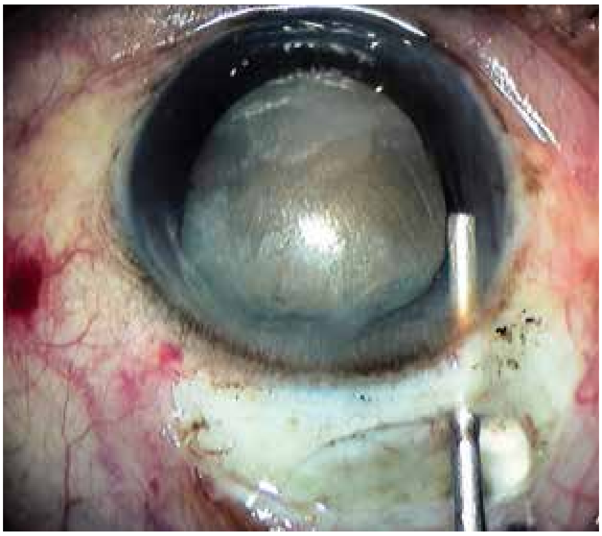


Figure 5 Checking the size of the tunnel



Cortex removal

Most of the lens cortex can be removed with a Simcoe cannula through the tunnel and side-port incision. Strip the cortex circumferentially, pulling centrally to avoid capsular stress. A sub-incisiona cortex can be safely aspirated through a side port. If stripping of Descemet's membrane occurs while cleaning the cortex, take great care not to tear it off. If this happens, inject air into the chamber at the end of the operation to push Descemet's membrane against the cornea.

While clearing the cortex with a Simcoe cannula, posterior capsule rupture and vitreous loss may occur. This can be avoided by carefully watching the posterior capsule.

To reduce the risk of a postoperative increase in intraocular pressure, thoroughly remove all viscoelastic. If there is vitreous in the anterior chamber, cortex removal should be done after anterior vitrectomy and vitreous removal. The capsular bag must be free of cortex at the end of the procedure in order to minimise postoperative inflammation, prevent posterior capsular opacification, and optimise visual outcomes.

IOL implantation

Before implanting the IOL in the capsular bag, check the IOL type and power and ensure that the sclerocorneal tunnel is adequate. The capsule should be intact or there should be adequate capsular support to place the IOL (in the sulcus in case of posterior capsule rupture). The capsular bag should be filled with viscoelastic to expand it and to protect the endothelium.

Enlarge the tunnel slightly if IOL implantation is difficult, to avoid damaging the haptics or bag.

Tips:

- Always re-inject viscoelastic before IOL insertion to avoid capsular trauma.
- Never push the IOL blindly – visualise both haptics entering the bag.
- If there is resistance during insertion, enlarge the tunnel slightly rather than forcing the lens.
- After IOL placement, check for pupil roundness, optic centration, and wound integrity.

Wound closure

After clearing the viscoelastic from the anterior chamber and from behind the IOL (which requires greater skill), close the wound by hydrating via the side port. Use the peritomised conjunctiva to cover the scleral incision; ensure it will remain in place. Exposure of the incision may increase the risk of infection as well as patient discomfort.

Suturing

Proper tunnel construction is the best closure. However, do not hesitate to place a suture if needed; this is better than risking hypotony, wound leak, or infection. Suturing is required if:

- The tunnel is too short, ragged, or extended
- There are intraoperative complications (e.g. scleral thinning or premature entry)
- There is an unstable wound, especially in patients who have high myopia or have already lost sight in one eye
- There is a persistent and significant leak.

Final steps

The final steps of MSICS surgery are:

- Instil intracameral antibiotic
- Form the anterior chamber one last time using balanced salt solution
- Apply subconjunctival steroid and antibiotic
- Pad the eye.

Tips:

- Always check for a watertight seal with Seidel's test before ending the operation.

"MSICS remains a high-quality, scalable, and cost-effective technique for cataract surgery. Visual outcomes depend less on technology and more on meticulous technique."

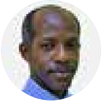
Conclusion

MSICS remains a high-quality, scalable, and cost-effective technique for cataract surgery. Visual outcomes depend less on technology and more on meticulous technique.

Optimisation lies in small refinements: creating the tunnel correctly, a well-centred capsulorrhexis, gentle nucleus delivery, complete cortex removal, stable IOL placement, and a watertight wound. With training, vigilance, and outcome monitoring, MSICS can deliver outcomes comparable to phacoemulsification, while serving the greatest number of people in need.

Further reading

Community Eye Health Journal Volume 21 Issue 65 Cataract complications. **bit.ly/4nEiapw**



Lloyd Harrison-Williams
Ophthalmologist/ Programme Manager: National Eye Health Programme, Freetown, Sierra Leone.

Postoperative examination after cataract surgery

Even excellent surgery can result in a poor outcome if postoperative care is inadequate.

Performing a safe, high-quality operation is vital, but good postoperative care is arguably even more important. Complications can occur even in the best of hands and within the best ophthalmology institution. However, with careful postoperative management, the impact of those complications can be minimised and a good outcome achieved. On the contrary, even excellent surgery can result in a poor outcome if there isn't adequate postoperative care.

Examination of the postoperative eye commences at the time of removal of the eye patch, on postoperative day 1. The timing of further visits will depend on local context. Ideally, there should be three stages of follow-up, for the following reasons:

- **Day 1.** To identify complications, particularly those that are urgent and sight-threatening
- **Week 1.** To monitor healing, inflammation, and IOL position
- **Weeks 4–6.** To confirm stable healing, optimise vision (refraction), and detect late complications

Note: More frequent follow-up may be needed for high-risk patients (people with diabetes, patients with complex cataracts).

What should be included in a postoperative assessment?

Visual acuity

Check near and distance visual acuity (VA) (the latter with and without pinhole). Early assessment of both eyes after cataract surgery is important, even though it may not necessarily dictate the eventual postoperative unaided VA. The difference between unaided and pinhole VA may give an early indication of the extent of residual refractive error.

Early refraction will show if there has been a mismatch between the intraocular lens (IOL) power prescribed based on biometry measurement, and the actual IOL that was inserted. If this is the case, prompt surgery is helpful to exchange the IOL before the capsule fibroses. If this isn't possible, allow the remodelling phase of wound healing to elapse and the corneal oedema to settle before the residual refractive error can be assessed and adequately corrected.

Intraocular pressure

Carefully check intraocular pressure (IOP), avoiding excess pressure on the globe. If excessively high (>30 mmHg), immediate treatment may be needed with acetazolamide and/or topical anti-glaucoma medications. If **retained viscoelastic** is the suspected cause, this can be let out at the slit lamp by carefully opening the paracentesis (if one was made during surgery). Regular monitoring of IOP should follow, until the pressure normalises and patient is weaned off the anti-glaucoma medications.

Examination of the eyelids

If the eyelids are swollen, is there abnormal discharge? This may be an early sign of **postoperative infection**. If the eye is proptosed, then there may be **retrobulbar haemorrhage** from the anaesthetic injection. Urgently assess the optic nerve function to see if lateral canthotomy is needed.

Examination of the conjunctiva

Is the conjunctiva extremely injected or red? Can you ascribe this to the sub-conjunctival or sub-Tenon's injection that was administered? If so, there is no reason to worry: the usual combination of antibiotic and steroid will help this to resolve. However, if this is associated with **discharge**, look for other signs of postoperative infection. Is there chemosis, eye pain, etc.? If so, it should be further investigated to rule out **endophthalmitis** or **anterior segment syndrome**, both of which are very serious. Check on other patients operated on that same day in case there is a cluster of the same complication.

Examination of the cornea

This is also key in determining whether the unaided VA represents the likely long-term outcome. If the cornea is perfectly clear, with no endothelial folds and with a nicely centred posterior chamber IOL, a low unaided VA that improves with pinhole suggests some refractive error. Severe visual impairment that does not improve with pinhole in the presence of a reasonably clear cornea will most likely be due to **posterior segment pathology** such as vitreous haemorrhage, macular hole/scar, retinal detachment, or advanced glaucoma.

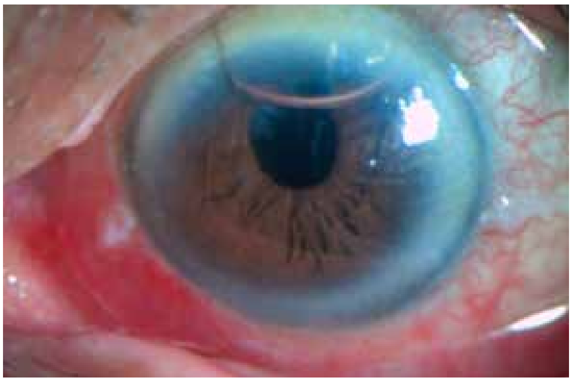
Preparing to examine a cataract patient after surgery. INDIA

Who should carry out postoperative examination?

It is essential that the person doing the postoperative examination knows the difference between acceptable levels of postoperative inflammation or swelling, and that which may signify a serious eye condition, which would necessitate hospital admission and intensive treatment with antibiotic and anti-inflammatory medications.

Postoperative examination is also an opportunity to identify any surgical causes of complications, which is helpful feedback for the surgeon. It is therefore highly recommended that surgeons should make it their point of duty to examine postoperative patients, especially during training or early in their career as a fully qualified surgeon.

Figure 1 Corneal oedema after surgery.



Check for **corneal oedema** (Figure 1). This could indicate raised IOP, corneal touch during surgery, or viscoelastic that has not been adequately removed.

Assess **keratic precipitates** on the endothelium in view of the type of cataract that was operated, noting whether it was a uveitic or traumatic cataract.

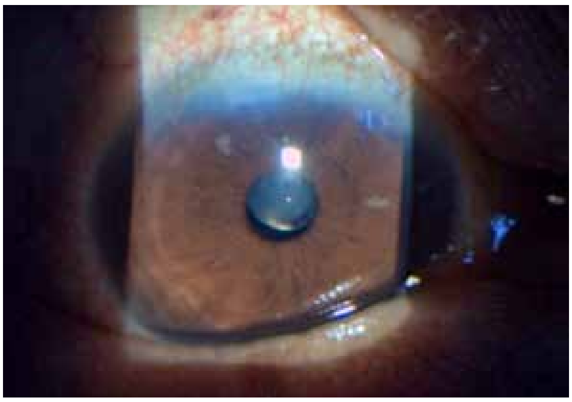
Evaluate **corneal opacitie**s in view of previously documented corneal scarring. If there was no such history of corneal scar, determine intraoperative or immediate postoperative cause of the corneal complications. Intraoperative causes include Descemet's stripping, endothelial touch (especially during difficult nucleus delivery), or vitreous prolapse. Determining the cause will help in the treatment of the patient affected, and provides helpful feedback to the surgeon so they can prevent similar complications in future.

Assessment of the surgical incision

Investigate any debris, blood clots, or potential evidence of prolapse of vitreous or iris from the corneoscleral wound. Administer topical anaesthetic agents and use sterile cotton buds or eye spear sponges to swab away debris. Difficulty removing debris may suggest **vitreous prolapse**, revealed when simultaneous movement of the iris occurs when the cotton bud/sponge is used to swab the debris. A peaked pupil also substantiates vitreous, and/or **iris entrapment**. Both would need immediate surgery, paying special attention to maintaining sterility in order to prevent endophthalmitis.

On postoperative day 1, the incision is still covered by the conjunctiva. At 4–6 weeks postoperatively, the incision should be fully healed (Figure 2).

Figure 2 Clear cornea with IOL in bag and a healed incision.



Anterior chamber

Assess the anterior chamber for cells and flare if corneal clarity permits, and for any retained cortical matter (Figure 3). **Note:** Air in the anterior chamber usually resolves after 2–3 days.

Patients with a **history of uveitis** should be identified preoperatively and treated with intensive preoperative steroids to ensure quiescence prior to surgery, then with ongoing intensive topical steroids postoperatively, with or without systemic steroids. Those without this history, who are found to have **postoperative uveitis**, may be treated with corticosteroid eyedrops such as prednisolone 1%. In addition to routine antibiotic eyedrops, mydriatic agents such as cyclopentolate 1% should be promptly commenced in adequate frequencies, then tapered in titration according to the severity of the anterior chamber activity. However, keep in mind the possibility of infection or uveitis in response to retained lens material. More frequent reviews of such patients are usually necessary and monitoring of their IOP is vital, particularly with prolonged steroid treatment, which can cause elevated pressure.

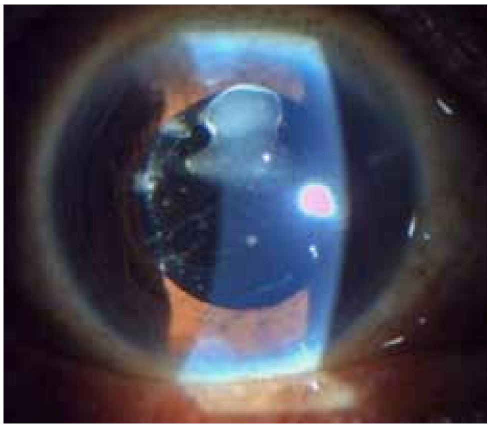


Figure 3 Cortical matter remaining in the anterior chamber. If it is significant in amount, and blocks the pupil or affects vision, it must be removed.

Intraocular lens

If the unaided VA is low, then dilated examination is needed to look for a decentred or subluxated/luxated IOL. If this is the case, it is necessary to evaluate whether there is sufficient capsular support to allow a lens to be stable in the bag or sulcus, or if an alternative means of IOL fixation is needed.

Fundus (if media are clear)

On the first postoperative day after surgery, perform a fundus examination to assess the retina and optic nerve. This makes it possible to detect issues such as retinal detachment, cystoid macular oedema, vitreous haemorrhage, or retained lens fragments. Early identification of these problems allows for prompt management, ensuring optimal visual outcomes and preventing long-term vision loss.

Figure 4 IOL in bag, mild postcapsular opacification, suture at side port.

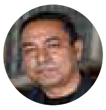
Posterior capsular opacity

This is a common postoperative complication, usually seen following dilation at the 4–6 week follow-up. If it significantly affects the patient's vision, then a YAG capsulotomy can easily be done to address it. If it is mild (Figure 4), it can be left as is.

Communicating with patients

Talk to your patient, and the person accompanying them, about their visual prognosis and what treatment may be needed. This gives patients more clarity about what **they** will need to do to achieve the best possible visual outcome for them, such as coming back for further surgery, or instilling eye drops. Honest and open communication builds patients' trust in the health system, which in turn supports their willingness to adhere to prescribed management or medication.

John Szetu
Medical Director, Fred Hollows Foundation NZ: Regional Eye Centre Honiara, Solomon Islands.



Lila Raj Puri
Medical Advisor, Asia: The Fred Hollows Foundation, London, UK.

Monitoring cataract surgical quality

Measuring quality helps to identify and correct the causes of poor outcomes.

Eye care service delivery in the islands in West Bengal. INDIA

Cataract is the world's leading cause of sight loss, responsible for 35% of global blindness. The quality of cataract surgery, and resulting patient satisfaction, are the engines that drive a sustainable cataract service. We must be able to measure quality before we can improve it; therefore, it is important to establish a systematic approach for monitoring and evaluating cataract surgical outcomes.

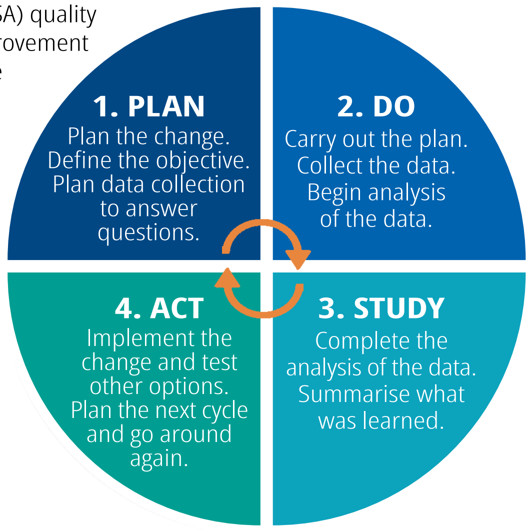
Cataract surgical outcome monitoring (CSOM) is a way to routinely monitor and evaluate cataract surgical outcomes by collecting and analysing preoperative, intraoperative, and postoperative data. These data are analysed, audited, and reported regularly (either monthly, quarterly, or annually) and shared with the hospital team, health and medical authorities, and other interested parties. The team may aim for specific targets to improve surgical quality (see panel).

Information gained during cataract surgical outcome monitoring can help **surgeons** to identify the main causes of poor outcomes and take corrective action to improve. In the last few decades, it has been shown that proactively monitoring the quality of surgical outcomes is associated with improvements in surgical outcomes. **Trainers** can use the data to monitor the 'surgical learning curve' of trainees, and **managers** can use the data to inform and monitor continuous quality improvement processes that involve the whole eye care team – e.g. by using the 'Plan, do, study and act' (PDSA) cycle, as shown in Figure 1.

Implementing a good cataract quality improvement programme, strengthening cataract surgical outcome monitoring, and encouraging eye surgeons to monitor their own results, provides opportunities to create a culture of audit and support, resulting in overall improvement.

It is very important to note that outcome monitoring should not be used to compare individual surgeons or centres. **We should not be tempted to reject patients with complicated cataracts and/or comorbidities for the sake of an audit, as they may benefit greatly from even partial improvement of their sight**.

Figure 1 The plan, do, study, and act (PDSA) quality improvement cycle



How to monitor cataract surgical outcomes

Collect the following data for each patient, as routinely as possible:

- Preoperative presenting visual acuity (PVA) at days 1–3, 1 week, and 4+ weeks (see definition of PVA in the panel). Indicate whether the PVA is unaided/uncorrected of if spectacles are worn
- Any improvement in visual acuity (VA) with pinhole
- Any data on pre-existing co-morbidities
- Intraoperative complications, such as posterior capsule rupture
- Postoperative complications, such as corneal oedema or endophthalmitis
- Refractive surprises
- The reasons for poor outcomes: **S**election (pre-existing disease), **S**urgery (surgical complications), **S**pectacles (failure to correct postoperative refractive error), **S**equelae (long-term

complications such as posterior capsule opacification, retinal detachment, or corneal complications).

If operating on patients with limited preoperative vision, visual acuity (VA) will be an adequate outcome measure. However, for patients whose vision may be 6/18 or better preoperatively (often those undergoing phacoemulsification), patient-reported outcome measures (PROMs) such as Catquest-9SF or Cat-PROM5 are appropriate validated tools.[4]

Patient experience and patient satisfaction can also be measured to monitor other aspects of the quality of the service (e.g., waiting times in clinic, perioperative pain management, or patient information).

How to monitor cataract surgical outcomes in low-resource settings

In high-income countries and other well-resourced settings, where local and national outcome monitoring systems are in place, cataract outcomes are often routinely recorded and reported. In lower-resource settings, other methods of outcome monitoring may be needed. For example:

- Data can be collected on paper forms, and/or stored electronically in simple Excel spreadsheets
- BOOST (Better Operative Outcomes Software Tool) can be used. This is an online app which allows surgeons to capture, analyse and monitor cataract outcome data (**boostcataract.org**)
- Some centres have electronic medical records which may have auditing functions.

Cataract surgical outcome monitoring and WHO recommendations

Cataract surgical outcome monitoring, and its reporting, varies widely across centres worldwide. Where data are available from lower-income facilities, the outcomes often fall below World Health Organization (WHO) recommendations for cataract surgical outcomes. Meeting these recommendations has become even more difficult now that WHO has raised the cut-off for 'good vision' from 6/18 to 6/12. At the time of going to print, the latest WHO recommendation is that ≥ 80% of eyes operated should have postoperative presenting visual acuity (PVA) of ≥ 6/12 (the new recommendations do not contain targets for 'borderline' or 'poor' vision). **Postoperative presenting visual acuity (PVA)** is defined as postoperative unaided distance visual acuity or, if spectacles or contact lenses are worn to the assessment, with the person wearing these. Postoperative presenting visual acuity should be tested between 4 and 12 weeks postoperatively.

WHO also recommends that countries track postoperative refraction and postoperative complication rates (e.g. posterior capsule rupture with vitreous loss, endophthalmitis, and unplanned return to the operating theatre); these targets should be based on local evidence.

Creating a shared vision for change in a complex system

A shared vision builds momentum by making it easier to mobilise support and influence decision makers.


Anna McKeon
Managing Director, Dialogue: Thinks Insight & Strategy, London, UK.


Samit Sakib Gore
Director of Operations and Innovation: Vision Friend Sakib Gore, Badlapur, India.

In complex systems, perspective is everything. Leadership is the art of seeing it all and finding a shared lens.

In the first article in this series (**bit.ly/3WB06Ru**), we explored the need for a new kind of leadership in eye health and introduced systems thinking as a foundational skill. In the second article (**bit.ly/3Linvms**), we looked at the first core leadership skill: systems thinking (what makes systems complex, how cause and effect aren't always obvious, and how change emerges through relationships). In this article, we focus on the second core leadership skill: strategic vision.

Why a shared vision matters

In complex and unpredictable environments, it's easy to get stuck reacting to problems as they arise. Without a shared sense of direction, such reactive efforts remain fragmented and short-term in nature. One of the most powerful things we can do as leaders is to help shape a shared purpose that enables diverse people to work together in the same direction.

A compelling vision acts as a compass, helping people make sense of uncertainty, understand the contribution their daily work makes, and align around what matters most. It helps them see how their roles fit into a bigger movement, builds momentum, and enables collective action across diverse stakeholders. It provides a common foundation for policy asks, communications, and campaigns. A shared vision builds momentum by connecting local actions to broader change, making it easier to mobilise support and influence decision-makers. Most importantly, it gives people a reason to believe that their efforts are part of something bigger.

Understanding root causes

Before defining a vision, effective leaders take time to explore the deeper forces shaping the current situation. This means considering what the root causes of problems might be, and what the forces for and against change are. Tools, like multiple cause diagrams and force-field analyses, can help us to identify patterns and power dynamics that aren't otherwise easy to see. This process is often best done collectively, involving people from across the system, to gain multiple perspectives and build shared understanding.

It is helpful to do this kind of exploration before developing a shared vision, because having a shared understanding of the problem is a key part of generating real insight and collective buy-in for the path forward. Through this process, we stop reacting and begin rethinking.

> **"Vision-building is not a one-time event. It's a continual process of engaging others, adapting to new realities, and reinforcing a shared purpose. "**

This idea builds directly on our second article's emphasis on systems mapping, where we zoom out to understand relationships, power, and the wider context. Without this, even the most well-intentioned vision can feel disconnected from reality.

Defining a bold, actionable vision

A vision is not a slogan, or an aspirational statement. It is a vivid description of a future you are actively working to create. IAPB's sector strategy, 2030 In Sight, has a strong vision statement: "A world in which everyone has access to the best possible standard of eye health; where no one is needlessly visually impaired; and where those with irreparable vision loss achieve their full potential."

Strong vision statements clearly identify who will experience the change, when the change is hoped to occur, and how it connects to other global frameworks. They are ambitious yet grounded, and offer a roadmap for others to align with.

Strong vision statements should:

- Clearly define **who** will experience the change
- Indicate **by when** we hope the change will happen
- Describe a realistic **future**
- Be **linked** to other initiatives.

For example, in the IAPB sector strategy, 2030 In Sight, **who** will experience the change is everyone; **by when** is 2030; and the **future** described is one where no-one is "needlessly" visually impaired – a more realistic goal than one in which no-one at all is visually impaired. Finally, the language used **links** to that used in the World Health Organization's statements on universal health coverage.

Creating such a vision means balancing big-picture ambition with feasibility. Leaders must be able to navigate competing priorities, align stakeholders, build coalitions, and identify and create strategic milestones along the way that keep the vision alive.

Communicating for mobilisation

Even the most compelling vision has little impact if it remains in a document or PowerPoint slide. These don't inspire, but stories do. To mobilise people, we must build tools that turn statistics into lived experience. Leaders must communicate it in ways that inspire others to act.

This means:

- Using simple, relatable language
- Connecting the vision to people's values and lived experiences
- Sharing stories that bring the vision to life
- Listening actively to build ownership and alignment.

Importantly, vision-building is not a one-time event. It's a continual process of engaging others, adapting to new realities, and reinforcing a shared purpose. This is because true mobilisation happens when people feel they are part of something meaningful and achievable.

Case study: Vision Friend Sakib Gore

'Vision Friend Sakib Gore' (Vision Friend) is a grassroots initiative driven by a powerful idea: that **clear sight is a basic right, not a privilege**. This clarity of purpose – that vision should be for all – became a powerful rallying point. It resonated across communities and cultures, and inspired thousands to get involved.

Founded by Sakib Gore, a former truck labourer from a farming village in India, Vision Friend has evolved into a movement, not because of strategy or funding, but because the vision was bold, inclusive, and personal. Since 1992, the organisation has reached over 1,700 villages across India, conducted over 2.7 million free eye tests, distributed 1.6 million free spectacles, and facilitated 63,000 free cataract surgeries, all without relying on external funding.

Vision Friend's success in mobilising people and resources is closely tied to how it communicates. Rather than simply raising awareness, or sharing data points, the organisation uses human stories and experiences to create empathy and drive action.

These aren't one-way messages, either: Vision Friend invites people, whether policymakers, funders, or community members, to attend multisensory events where they can experience how vision loss feels and what is possible when sight is restored. Events are held in villages, camp locations, factories, educational institutions, and cities.

During an immersive eye health awareness campaign at a school in Thane District, Vision Friend Sakib Gore used augmented reality devices, cataract simulation glasses, and anatomical eye models to help children understand how vision works. They also screened the film *In Pursuit of Light* and distributed printed information about refractive disorders and treatable causes of blindness. INDIA

Some of the tools Vision Friend uses at these events include:

- **Cataract simulation glasses.** These help decision-makers and the public understand the disorientation, dependency, and danger of preventable blindness, transforming a clinical concept into an emotional, lived experience.
- **Documentary storytelling.** *In Pursuit of Light*, a documentary co-created with volunteers, traces Vision Friend's journey from one labourer's mission to a global movement. By explaining systems change through a personal story, the film invites people to relate and to act.
- **Immersive experiences:** Augmented reality, virtual reality, and anatomical eye models offer a visceral way for funders and policymakers to engage with the issue, making it harder to ignore and easier to champion.

"People don't just learn about eye health; they see themselves in the story and choose to become part of the solution. "

These approaches have helped shift public and political perceptions from passive awareness to active engagement. People don't just learn about eye health; they see themselves in the story and choose to become part of the solution.

At every level, Vision Friend's messaging reinforces the shared vision: a vision that communities can see themselves in, and one that others can adopt, adapt, and carry forward.

What does this mean for eye health professionals?

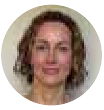
This story reminds us that sustainable change doesn't start with funding or infrastructure, it starts with a clear, shared purpose that people can believe in and act on. For eye health professionals, especially in low- and middle-income settings, that insight translates into some practical steps:

- **Start with the 'why'.** Make the purpose of your work visible and relatable. Is your message about dignity? Opportunity? Inclusion? People mobilise around values, not just services.
- **Co-create the vision.** Ask people what a future with accessible eye health looks like to them, and let their ideas shape your work.
- **Use simple tools to spark empathy.** These can include cataract simulation glasses. Think creatively about how to help others understand the problem. Visual, hands-on experiences can do more to mobilise support than any report.
- **Use stories as well as statistics.** As with the volunteer-made documentary, real stories of transformation help people see what's possible – and see their role in it. Make space for case studies and community voices in your communications.
- **Build for longevity, not dependency.** Invest in leadership and ownership within communities; for example, local volunteers, peer educators, or youth groups who can carry the vision forward without you.

Ultimately, this is about mobilising people: not around a service, but around a purpose – one they feel they belong to and can contribute to. That is how you build movements that last.

Creating and using a simulation model to practice sub-Tenon's anaesthesia

This simple, low-cost model can be used for teaching and practising your skills.



Althea le Roux
Ophthalmic Surgical Skills Trainer: University of Cape Town Community Eye Health Institute, South Africa.

James Rice
Consultant Ophthalmologist: Division of Ophthalmology, University of Cape Town, South Africa.

Most ocular surgery is performed under local anaesthesia. Anaesthetic options include: topical (eye drops), intracameral, sub-Tenon's, peribulbar and – less commonly – retrobulbar injections. Clinicians choose the type of anaesthesia based on patient and ocular factors, the type of surgery, and the expected duration of the procedure. Patient monitoring in case of an adverse event related to anaesthetic administration is a basic requirement.

We present the construction and use of a simple, low-cost simulation model for teaching and practicing sub-Tenon's injections. Trainees learn the relevant anatomical landmarks and details necessary for safe performance of the technique.

Similar training models have been described elsewhere.[1]

How to make the simulation model

What you will need (Figure 1):

- A rubber ball of approximately 25 mm diameter (a polystyrene ball can also be used)
- 2 small rubber balloons in different colours
- Ballpoint or felt-tip pens in different colours
- Thin cardboard
- Adhesive tape
- Scissors
- A ruler
- A roll of toilet paper

Figure 1 What you need to make the simulation model.

Note: If you are using a polystyrene ball, put some ultrasound jelly or cooking oil on the ball before covering it with the balloons. This will support the gliding action of the instruments.

Instruments required for the procedure (Figure 2):

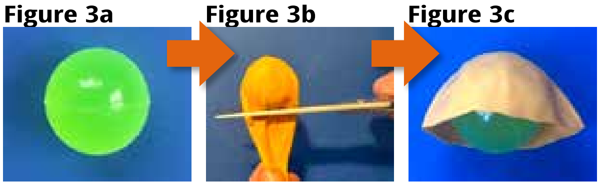
- Hoskins #18 tissue forceps or similar
- Blunt-tipped Westcott curved scissors
- 5 ml syringe filled with water
- Sub-Tenon's cannula (the irrigation port of a Simcoe cannula can also be used)

Figure 2 Instruments for the procedure. From left to right: tissue forceps, Westcott scissors, syringe, sub-Tenon's cannula.

How to make the model

Push the ball (Figure 3a) into the first balloon. Cut off the remaining part of the balloon (Figure 3b), so that the ball is just covered (Figure 3c).

Figure 3a **Figure 3b** **Figure 3c**



Next, push the (now covered) ball into the second balloon (Figure 4), ensuring that the first balloon remains centred around the ball.

Figure 4

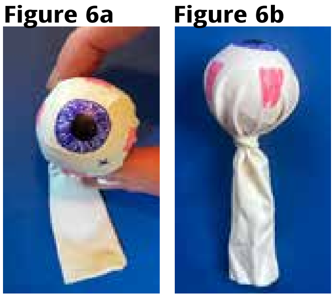
The first layer represents the Tenon's fascia, and the second the conjunctiva.

Cut off the thickened, round edge (or lip) of the second balloon (Figure 5a). This can now be used as an elastic to tie the second balloon at the base of the covered ball (Figure 5b).

Figure 5a **Figure 5b**

Note: The balloons should not be stretched or tight when fitted around the ball; they should be slightly loose.

Figure 6a **Figure 6b**



At the top of the ball, draw a circle with a diameter of approximately 12 mm to represent the corneal limbus. Colour in the iris and pupil (Figure 6a). Next, draw the rectus muscles, starting 5–7 mm from the limbus. This helps with teaching the anatomical landmarks and orientation (Figure 6b).

References

1 Lersch F, Schweizer T, Berger-Estilita JM. From kitchen to clinic: cherry tomato model for sub-Tenon's block training. Anaesth Rep. 2024;12(2):e12321. Published 2024 Sep 5. **doi:10.1002/anr3.12321**

2 Guise P. Sub-Tenon's anesthesia: an update. Local Reg Anesth. 2012;5:35-46. **doi:10.2147/LRA.S16314**

How to make the cone

Using the thin cardboard, cut a semicircle with a diameter of 12cm, as shown in Figure 7a. Fashion a small cone as shown in Figure 7b. The cone opening should be slightly wider than the diameter of your toilet roll's inner cardboard cylinder (> 4.5cm), see Figure 7c. Secure the overlapping parts with adhesive tape.

Figure 7a

Figure 7b

Figure 7c

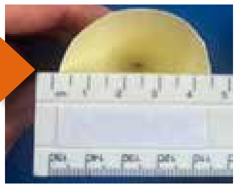


Figure 8

Cut about 5mm off the tip of the cone to create a small opening for the 'tail' of the balloon to pass through. Place the balloon-covered ball into the cone, pulling the tail end through the small opening (Figure 8). The 'eyeball' should now fit snugly in the 'socket', with a small amount of movement still possible.

Figure 9

Place the cone into the toilet roll as shown in Figure 9. Draw a 'nose' and an 'eyebrow' on the toilet roll to serve as an orientation guide.

The cone can be tilted to simulate the patient looking supero-temporally during the procedure. All four quadrants can be used, rotating the cone appropriately so as to always target the inferonasal quadrant.

How to practice the block

The surgeon stands at the head of the patient model, with the patient looking supero-temporally. Position the eye appropriately.

When performing the procedure on a patient: Prepare the conjunctiva by instilling topical anaesthetic drops, instil a drop of povidone iodine 5% solution, and place a speculum.

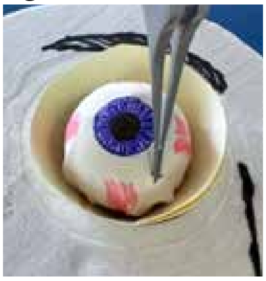
The planned incision, which should be 3–4 mm long, should be 5–8 mm from the limbus in the inferonasal quadrant, midway between the inferior and medial rectus muscles. The ideal location for the incision can be indicated on the balloon using a marker (Figure 10).

Figure 10

Be sure to target posterior to the anatomical insertion of the Tenon's fascia, located 1–2 mm from the limbus, to successfully access the sub-Tenon's space.

Press down perpendicularly to the sclera (ball) with the tissue forceps in your non-dominant hand and firmly grasp and lift the conjunctiva and tenon's fascia (2 balloon layers) together, creating a small 'tent' (Figure 11).

Figure 11



With the scissors in your dominant hand, make a small cut just anterior to the grasping point, with the tip of the curved scissors perpendicular or at 45 degrees to the sclera (ball). Cut through both 'conjunctiva' and 'Tenon's' (the two balloon layers) together, usually with a single cut, to access bare 'sclera' (the ball). This can be confirmed by identifying the lifted coloured balloons held by the forceps.

Figure 12

The next step is to create a channel into the sub-Tenon's space (between the Tenon's and the sclera, i.e. between the ball and the first balloon) – this is where the cannula will go. While still grasping the conjunctiva and Tenon's with the forceps, advance the closed scissors 10 mm in a radial direction into the sub-Tenon's space, with the curve of the scissors following the curve of the sclera, allowing the scissors to open slightly (see Figure 12).

When performing the procedure on a patient: A small amount of blunt dissection may be required to create a plane between the sclera and the Tenon's layer. However, try not to make the opening or the channel excessively big, as this will enable the anaesthetic to reflux easily out of the space during injection.

Figure 13

Maintaining the grip with the forceps, gently remove the scissors. Take the syringe with the cannula and advance it into the sub-Tenon's space with the curve following the surface of the sclera, aiming to position the tip against the sclera, just posterior to the equator of the eyeball (Figure 13). This is the ideal injection position.

With the cannula now in place, 'close' the opening by bringing the tissues in the forceps against the scleral surface, which may encourage a more posterior flow of the anaesthetic. Slowly inject the desired amount of anaesthetic, usually about 3–4 ml. On the model it is useful to only inject a small amount of water (<1 ml) to prevent wetting the entire setup.

Immediate reflux of the anaesthetic suggests that the space has not been adequately opened, and the scissors are used again to gently extend the space.

When performing the procedure on a patient: After the injection, you may place light pressure on the conjunctiva to reduce bleeding.

CAUTION! The sub-Tenon's space is intraconal, providing access to the optic nerve, short ciliary vessels, and vortex veins. Even though the cannula is blunt, it is still possible to damage vital tissue if you make aggressive, sweeping, or very posterior movements.

Further information on the finer points of the technique, as well as cautions and possible complications, are described here: **bit.ly/3weZ8cL3**[2]