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Optometric consideration of intraocular lenses and the management of IOL patients

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OPTOMETRIC CONSIDERATION OF INTRAOCULAR LENSES AND THE MANAGEMENT OF IOL PATIENTS

by Timothy R. Freeh
Douglas C. Dolan

Submitted to
Dr. Barbara Dirks, Adviser
April 1986
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Dr. Barbara Dirks

Douglas C. Dolan

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ABSTRACT

Intraocular lens implantation is becoming an increasingly popular treatment for cataract patients. Optometrists need to realize the importance of identifying the perspective IOL patient, be knowledgable about the various types of IOL's used, know the various complications which may arise due to the surgery itself, IOL design, or intolerance of the lens by the patient, and supply adequate and professional management in the pre and post-operative care of the IOL patient. It is hoped that this paper will provide the Optometrist with the necessary information required to serve this growing patient population with the optimum in professional eye care.

KEY WORDS

Catatact surgery, Complications of IOL surgery, Intraocular lens, Optometric management of IOL patients, Referral of patients for IOL implantation
INTRODUCTION

Today’s cataract patient has a viable alternative to aphakic glasses and contact lenses. Intraocular lenses have become an increasingly popular choice of treatment for this population. Improved lens designs and surgical techniques have made this a relatively safe procedure with resultant good visual functioning. Consequently, Optometrists will be expected to be familiar with this procedure, offer this option to their patients, counsel their patients about the procedure, refer their patients to a qualified and competent Ophthalmologist, and provide appropriate pre and post-operative care. This paper will present a brief history of intraocular lenses, their current trends of use, the referral and preparation of cataract patients for surgery, possible complications stemming from the surgery, and optometric management of the IOL patient.

TYPES of INTRAOCULAR LENSES

Generally, intraocular lenses (IOL's) can be split into three different groups; anterior chamber IOL's (ACIOL's), posterior chamber IOL's (PCIOL's), and iris supported lenses.

ACIOL's are inserted into the anterior chamber and use the angle recess
for fixation support. They require a less complicated surgery than the other two groups and can be done with either an intracapsular cataract extraction (ICCE) or an extracapsular cataract extraction (ECCE). Original designs were rigid and often touched the cornea causing edema and decomposition. They were also hard to measure to accurately fit into the angle causing pain if too big or movement of the lens if too small. Introduction of flexible lenses and better surgical techniques for measuring the needed size have reduced these problems significantly. However, ACIOL's are presently used as a secondary implant if there have been problems with the initial surgery.

PCIOL's have been made possible through improved lens designs and surgical techniques. These improvements have made this type of implant the lens of choice today. Ideally the lens is placed in the remaining lens capsule but often, only the ciliary sulcus is used for support. It is the most refined of the IOL surgeries but has many advantages including being closest to the natural lens position. Other advantages include; the lens is far removed from the cornea, the pupil is free to move, there is less chance of the surgeon damaging the cornea, and in uncomplicated procedures, there is less chance of cystoid macular edema (CME) and retinal detachments occurring.

Iris supported lenses come in two types. Iris fixated IOL's (IFIOL's), which depend on the iris for support and stabilization, and iridocapsular IOL's (ICIOL's), which rely on the lens capsule and the iris for support. Therefore, the lenses have the advantage of no structures in the angle or touching the cornea. Although more complicated surgically, they were met with good support initially. Long-term effects, however, showed a higher incidence of CME, endothelial cell loss, and iris erosion and atrophy.

IOL improvements have resulted in a dramatic turnaround in the type of IOL's used and the number of implant surgeries. In 1978, approximately
154,000 IOL's were implanted. IFIOL's accounted for 52% of these, ACIOL's 25%, ICIOL's 19%, and PCIOL's 4%. In 1983, approximately 550,000 eyes were implanted. PCIOL's were used in 63% of these eyes, ACIOL's in 36%, and IFIOL's and ICIOL's were used in less than 1%. Today the trend is increasing toward PCIOL's as iris-supported lenses have largely become obsolete. The overall success with these lenses can't compare to the results with modern ACIOL's and PCIOL's.

REFERRAL and REASSURANCE of a POSSIBLE IOL PATIENT

The decision to refer a cataract patient for IOL implantation rests with the Optometrist. Therefore we, as Optometrists, must be capable of balancing the possible benefits of surgery with the possible risks involved. We need to decide at which point, if any, during the development of the cataract, the benefits of such a surgery would indeed outweigh the risks. A referral should not be made until this point is reached, unless an emergency case presents itself or if the patient insists upon such a surgery.

There are many factors to consider; the patients specific visual needs, the condition of the fellow eye, and the importance of binocular vision to the patient. Unless the surgery will result in vision to perform tasks that are important to the patient, he may remain frustrated, no matter how successful the surgery. A careful history and discussion with the patient will minimize such an outcome.

The mention of cataract surgery may worry and concern many patients. Optometrists must be able and willing to reassure and support these
patients. They often have misconceptions about cataract surgery and it is our responsibility to explain that even though some problems may have existed years ago, many have been solved today. For instance, patients may have the perception that a cataract is a form of cancer, since both grow. Another misconception is that a cataract signals a generalized deterioration of the entire body. Some patients may still believe that cataract surgery requires prolonged bed rest with head immobilization and many days away from work. A discussion with a patient who may have these or similar concerns may avoid unwarranted fear and anxiety. We should also explain that there is very little pain although some discomfort is present, it is usually short lived and can quickly be eliminated.

Another primary concern of many patients is that of finances. With the use of modern techniques and instrumentation, the patient is usually back to work very quickly after surgery, thus reducing the high cost of hospitalization. Many times the Optometrist may know the patient and his concerns much better than the surgeon. A great service to the patient may be performed, if along with the referral, a statement is made by the O.D. explaining the patient's financial situation to the surgeon. In many cases, a reduction in fees may be available.

The patient should also be counseled about the procedure so that they know what to expect. If they will be hospitalized, they should be told about the various laboratory tests which may be performed, such as blood tests, chest X-rays, and EKG's. They should be told to expect a visit from various medical specialists such as an anesthesiologist, an intern, or a retinal specialist. These studies and consultations are to minimize the likelihood of unexpected complications and insure the patients successful recovery. A variety of medications will be administered before, during,
and after surgery to minimize patient anxiety, pain, and the possibility of infection.

With a proper referral at the right time to a competent surgeon, the risk of patient frustration and unhappiness following surgery will be greatly reduced. The satisfied patient should return to the referring Optometrist within six to seven weeks after surgery for post-operative care, including any subsequent correction for residual refractive error. Today many surgical centers return the patient to the Optometrist within two days if the surgery is uncomplicated.

COMPLICATIONS of IOL's

While IOL surgery is a relatively safe procedure, there are numerous long and short term complications that can arise. Recent developments in surgery have greatly reduced many of the risks, however it is important that we, as Optometrists, recognize what complications may present themselves when evaluating an IOL patient, and be able to distinguish between those which constitute an emergency from those which do not.

A) RETINAL COMPLICATIONS

1) Cystoid Macular Edema (CME)

CME is a complication of cataract surgery, with or without IOL implantation. It consists of an accumulation of fluid in the cystic spaces of the outer plexiform layer causing a thickening of the retina. It is currently thought to be caused by one or a combination of the following factors; increased permeability of perifoveolar capillaries, ischemic tissue injury,
secondary to intraocular inflammation, or traction upon the macula fol­
lowing vitreous shifts. Most cases of CME present 4-12 weeks post-
operatively but may occur up to several years later with decreasing acuity
of 20/50 to 20/200. The patient complains of reduced vision and may be
photophobic. An exam with a fundus contact lens can show a thickened
macular area with associated honeycomb appearance but this is often
difficult to appreciate. Flourescein angiography is the definitive diagnostic
test for CME.

Generally, it is more accepted that uncomplicated ECCE produces less
CME than uncomplicated ICCE. This indicates that the intact posterior cap-
sule may somehow reduce the incidence of CME. Other related factors
include the patients age, the status of the vascular system, and the overall
health of the patient. CME is often self limited with resolution approx. 6
months following onset.

2) RETINAL DETACHMENT

It is well established that retinal detachments occur much more fre-
quently in aphakes. One study has shown the risk 65 times higher than that
among phakic individuals. It is important to note that in recent years,
there has been a decline in the incidence of retinal detachments pointing to
better surgical techniques and instrumentation.

Detachments are caused by a shifting of the vitreous base during
surgery. Vitreous loss greatly increases the risk. Some risk factors include
posterior uveitus, axial myopia, a history of detachment in the oppisite eye,
and/or a family history of detachment. Onset is usually 6 months
post-operatively. The patient symptoms may include decreased visual
acuity, decreased peripheral or side vision, photophobia, and flashers and floaters.

3) DIFFICULTY in VISUALIZATION of the FUNDUS

Difficulty in fundus visualization by direct and indirect ophthalmoscopy presents another problem, especially with many older IOL styles. This is particularly true with some types of iris supported lenses where the pupil is often miotic and mydriasis may be difficult to attain. However, with modern IOL styles, fundus visualization has become much less of a problem. Better mydriasis is now attainable in most instances. Still, peripheral fundus visualization through a modern IOL may be difficult due to glare, optical aberrations, or when a posterior capsular membrane is present. Visualization of various fundus areas may also be difficult if the IOL is tilted, decentered, or subluxated.

B) IRIS COMPLICATIONS

1) IRIS CHAFING and EROSION

The intact surfaces of the iris and ciliary body may be disrupted due to excessive contact with any IOL style, thus disrupting the integrity of the blood-aqueous barrier. When loops or footplates of an IOL cause iris-ciliary touch, the potential increases for a release of substances that may cause subsequent inflammation and fibrosis.

Some consequences of iris erosion and chafing may include late postoperative hyphema from tearing of iris vessels and pigmentary dispersion syndrome. The later may subsequently cause IOL-induced pigmentary
2) IRIDODIALYSIS

Iridodialysis is a separation of the iris root from its attachment to the ciliary body which creates a periperal iris opening. Complications of this iris separation are usually minimal, however a large iridodialysis may result in a severe pupillary displacement or may be a source of intra-operative or post-operative bleeding.\(^\text{10}\)

3) IRIS PROLAPSE

Iris prolapse can be caused by severe post-operative trauma. It may be recognized by dark uveal material in the wound and by the irregularity of the pupil. This prolapse of uveal tissue through a healing cataract incision does not seem to be more frequent with an IOL implantation.\(^\text{11}\) With improved implantation techniques, such as improved sutures and consequent tighter wound closure, the incidence of post-operative iris prolapse has decreased.\(^\text{12}\) However, if prolapse does occur, prompt surgical closure of the wound is required.

4) IRIDO-PSEUDOPHAKIC SYNECHIAE

With the use of iris fixated IOL’s, posterior synechiae often develop between the iris and the IOL following ECCE. A permanent iris-IOL synechiae can prevent subsequent dilation of the pupil with cycloplegic agents.\(^\text{13}\) With time, these iris-IOL adhesions may vascularize. In many cases, rapid mydriasis or miosis may cause these vessels to rupture, with consequent hemorrhage and uveitis.\(^\text{14}\)
While the incidence of the irido-pseudophakic synechiae is fairly high with iris-fixated IOL's, it's occurrence is much less with the use of anterior and posterior implants.

5) PUPILLARY BLOCK

Pupillary block is a closure of the pupil which may prevent the flow of aqueous from the posterior to the anterior chamber, and is a well known complication of cataract surgery and IOL implantation. Possible causes include leakage of a wound, inflammation, hemorrhage, and/or vitreous prolapse. It may lead to glaucoma, especially if associated with iris fixated or anterior chamber lenses. This type of glaucoma rarely occurs with posterior chamber IOL's. Since pupillary block is very common with iris-supported lenses, it is essential that peripheral iridectomies be performed to ensure continued circulation of aqueous humor from the posterior chamber to the anterior chamber.

6) PERIPHERAL ANTERIOR SYNECHIAE

Peripheral anterior synechiae (PAS) formation may occur following implantation of anterior chamber IOL's. These synechiae, which attach to anterior chamber loops or footplates within the angle recess, are usually innocuous if the IOL is properly sized and may even be useful in improving fixation of the lens. However, if these synechiae occur in abundance and are broadly scattered throughout the angle, a potential may exist for secondary glaucoma.
7) PUPILLARY CAPTURE

Pupillary capture is a result of the prolapse of a posterior chamber IOL.\textsuperscript{18,19} This is frequently secondary to post-operative dilation to reduce posterior synechiae, and may result in an elliptical shaped pupil and visual distortion.\textsuperscript{20} Other than the possible complication of visual distortion, pupillary capture usually does not create a serious problem.

8) IRIS TUCK

Iris tuck is a condition in which a segment or fold of peripheral iris tissue is entrapped in the angle of an anterior chamber IOL. This can cause an oval shaped pupil which increases in its oval appearance over time. Slight to moderate iris tuck is probably only of cosmetic significance, but if severe it can be accompanied by pain, cause chronic inflammation leading to possible corneal complications, and/or cystoid macular edema. This may require removal of the IOL.\textsuperscript{21}

C) CORNEAL COMPLICATIONS

1) CORNEAL EDEMA

Corneal edema following IOL implantation, may result from a pre-existing corneal compromise, vitreo-corneal touch, inflammation, glaucoma, and/or trauma. With development of newer styles of IOL's, better quality control, and improved surgical techniques, corneal complications have decreased markedly.\textsuperscript{22} However, corneal endothelial damage is still a problem with patients implanted with earlier IOL styles.\textsuperscript{23} If the endothelial cell
damage is extensive, then bullous keratopathy may result. This is characterized by general edema and clouding of the corneal stroma and epithelium with bleb formation. This condition is accompanied by pain and reduced visual acuity.

Studies have shown that endothelial cell loss is more common with iris-supported lenses than either anterior or posterior chamber lenses with the posterior IOL'S appearing to cause less cell loss than other styles. 24, 25

2) IOL CORNEAL TOUCH (INTERMITTENT TOUCH SYNDROME)

Repeated contact of an anterior chamber IOL with the cornea may cause ongoing loss of endothelial cells. Intermittent touch syndrome, as described by Drews, 26 includes ciliary flush, localized corneal changes, and cystoid macular edema. Other factors such as rubbing the eye or working conditions may contribute to the pathogenesis of this syndrome.

Early recognition is vital to the management and prevention of further corneal problems. With prompt elimination of the touch, the syndrome may be reversed.

3) EPITHELIAL DOWN GROWTH

Epithelial down growth is a result of poor surgical technique. It occurs when epithelium is introduced into a wound with uveal tissue, such as the iris. The epithelium then grows across the cornea and into the angle and may cause chronic inflammation, corneal edema, and/or glaucoma. It is treated by removal of the epithelium.
4) KERATITIS and/or CORNEAL ULCERATION

Eyes with previous corneal compromise, or bullous keratopathy are more susceptible to secondary corneal ulceration and keratitis than are healthy eyes.

D) INFLAMMATORY COMPLICATIONS

1) UVEITIS-GLAUCOMA-HYPHEMA (UGH) SYNDROME

UGH syndrome, due to warped footplates of some anterior chamber lenses, produces a rocking motion of the lens causing a mechanical irritation at the iris root and adjacent structures of the angle. This results in uveitis, hyphema, and glaucoma. The syndrome should subside if the implant is removed. This condition has recently decreased in incidence due to better quality control and refined lens design. However, UGH syndrome may still present itself with the use of certain anterior chamber implants.

It is important to note, that any one of the triad of symptoms occurring in UGH syndrome can be a single complication within itself.

a) Uveitis

Anterior uveitis usually occurs secondary to trauma or mechanical irritation, while posterior uveitis is generally due to an autoimmune reaction associated with retinal lens material. Its onset is usually 2-4 weeks post-operative. Both anterior and posterior uveitis may be treated with steroids. In addition, posterior uveitis frequently requires the removal of lens proteins.

b) Glaucoma

Glaucoma is a complication which needs to be identified early in the
disease process. Its cause may include one or more of the following:

1) Inflammation of trabecular meshwork secondary to trauma
2) Blockage by inflammatory debris and peripheral anterior synchiae occurring in anterior uveitis
3) Blockage by vitreous prolapse
4) Pigmentary block associated with iris atrophy
5) Pupillary block - an obstruction between the pupil and iridectomy causing a failure of communication of aqueous between the anterior and posterior chambers

Treatment for glaucoma includes the use of therapeutical agents such as Timolol. If the cause of glaucoma is pupillary block, dilation may prove beneficial in allowing release of the obstruction which prevents normal aqueous flow. If not, surgery may be required.

c) Hyphema

Hyphema is a sanguineous or bloody exudate occurring in the anterior chamber of the eye. It is caused by leakage from wound vessels or iris vessels and has an onset of approximately 1-7 days post-operatively. A partial hyphema will usually absorb spontaneously without damaging the eye. A total hyphema, however, can cause a secondary glaucoma. Its treatment may include steroids and IOP control, and if severe, paracentesis.

2) INFECTIOUS ENDOPHTHALMITIS

This inflammation of the internal tissue of the eye is a potentially devastating complication of any surgical procedure, including IOL implantation. Its symptoms include pain, chemosis, a rapidly developing hypopyon, and corneal decompensation. Its onset may be 2-3 days after sur-
gery if bacterial or up to 3 months if caused by a fungal infection. The treatment and prognosis of infectious endophthalmitis depends on an early diagnosis aided by cultures of aspirated vitreous.

3) SYMPATHETIC OPHTHALMITIS

As with infectious endophthalmitis, sympathetic ophthalmitis may be a very serious complication of not only IOL implantation, but also with any surgical procedure or wound which may allow a foreign antigen to enter the eye. The disease begins by showing a chronic uveitis with cells, mutton fat Kp's, and an iritis occurring in the operated or wounded eye. The sympathizing eye soon follows. The initial uveitus must be treated with aggressive steroid use. If the inflammation of the exciting eye does not resolve, enucleation may be necessary to prevent involvement of the sympathizing eye.

E) OPACIFICATION of the MEDIA

1) PRECIPITATES on the POSTERIOR CORNEA or IOL

These precipitates are mainly composed of pigment, inflammatory cells, fibrin, and blood breakdown products and seen on the posterior surface of the cornea or on the surfaces of the IOL. They present during the immediate post-operative period and usually clear spontaneously as the operated eye heals. However, if an inflammation becomes chronic or hemorrhage occurs, the precipitates may become dense enough to cause a decrease in vision.29

2) POSTERIOR CAPSULAR OPACIFICATION
Posterior capsular opacification is a common complication of ECCE and is due to a migration of residual subcapsular epithelial cells (Elshnig bodies) to the posterior capsule where they lay down dense collagen fibers.\textsuperscript{30} The incidence of posterior capsular opacification seems to be higher in children and young adults. One study showed that up to 50\% of adults develop an opaque secondary membrane within 3-5 years following ECCE.\textsuperscript{31} This opacification can decrease visual acuity and may be treated with surgical discission or by neodymium YAG capsulotomy.\textsuperscript{32}

F) MECHANICAL COMPLICATIONS CAUSED by the IOL

Many of the complications due to mechanical factors of the IOL have been previously discussed. Therefore, only a brief summary of possible causes and associated effects will be considered below.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Possible Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Anterior Touch &quot;Intermittent Touch&quot;</td>
<td>Vaulting or improper fit of ant. chamber IOL</td>
</tr>
<tr>
<td>2) Posterior Touch</td>
<td>Contact of iris supported IOL with the motile iris</td>
</tr>
</tbody>
</table>

1) Reduction of endothelial cells
2) Edema, possibly assoc. with bullous keratopathy
3) Glaucoma, if damage to angle
1) Iris erosion or grating
2) Breakdown of blood-aqueous barrier
3) Inflammation
3) Erosion of anterior chamber angle
   Excessive contact of an ant. chamber IOL with the ant. chamber angle

4) Erosion of ciliary sulcus
   Excessive contact of post. chamber IOL loops with the ciliary sulcus

1) Peripheral anterior synechiae
2) Endothelial cell loss
3) Fibrous metaphasia of the endothelium
1) Neovascular glaucoma (rare)

G) COMPLICATIONS of LENS IMPLANT POSITION

Dislocation or decentration of IOL implants were a common problem with early IOL's. These complications have since decreased with the advent of modern IOL's and better size determining estimates. A chart depicting possible complications of various IOL types if dislocation or decentration were to occur is found below.

1) Iris-Fixated IOL's
   a) Iris chafing and erosion
   b) Difficulty in visualizing fundus
   c) Decrease in vision

2) Anterior Chamber IOL's
   a) Iris chafing
   b) Iris tuck
   c) Excessive pressure and erosion into the anterior chamber angle recess, possibly causing glaucoma
   d) May dislodge through iris defects already present

3) Posterior Chamber IOL's
   a) Visual problems
b) Difficulty in visualizing the fundus, especially peripheral fundus
c) Hypersensitivity reaction due to leaking lens fiber proteins
d) "Windshield Wiper Syndrome"

1) SUNSET SYNDROME

The "sunset syndrome" refers to an inferior decentration or dislocation of the IOL so that the superior edge of the lens is visible within the pupillary aperture. This usually occurs as a result of inferior capsule disinsertion and may cause a decrease in vision or monocular diplopia.

2) WINDSHIELD WIPER SYNDROME

The "windshield wiper syndrome" occurs when a posterior chamber IOL is poorly fit and/or fixated. In this condition the implant moves from side to side on head tilt and may cause variable vision or diplopia.

3) INDICATIONS for REFERRAL

Indications for referral for surgical treatment of significant lens decentration, subluxation, or complete dislocation include decreased vision, excessive uveal touch, persistent uveitis, or retinal injury.

OPTOMETRIC EVALUATION of the PSEUDOPHAKIC PATIENT

1) CASE HISTORY

A complete case history needs to be taken on every patient. It is important to know when the surgery was performed and if any medications are still being used. Many surgeons prescribe oral and/or topical steroids to control post-surgical inflammation and mydriatics to prevent synechiae.
Normally, these pseudophakic patients are followed 6-8 weeks post-operatively by their surgeon, but more and more, Doctors of Optometry are responsible for their care. Therefore, depending on your relationship with the surgeon, one should know their protocol for drug use before any modification in drug therapy is carried out. Special consideration should be given to any symptoms elicited from the patient.

2) VISUAL ACUITY

As with all patients, visual acuity is an important finding. This is especially true for pseudophakic patients since it is probably the main reason an implantation was performed. Be aware that any preexisting condition that had decreased acuity before the implant, other than lenticular, will still be present.

After refraction, the typical pseudophake achieves 20/20 or 20/25 acuity. There are many factors involved, but a lower acuity should signal the possibility of an organic problem. Pinhole acuity is helpful in determining if the decrease is refractive. Other causes would include corneal edema, anterior or posterior uveitis, retinal detachment, capsular opacification, CME, and inflammatory reactions of the conjuntiva. Any decrease in acuity should be explained. If capsular opacification is suspected, testing for contrast sensitivity is useful. Take acuity readings with standard exam room lighting. Increase the lighting to the maximum level and retake acuities. Patients with an opacification will report a drop in acuity.

3) REFRACTION
The refraction itself is essentially just good optometric care and for the most part is carried out as you would with any patient in your office. There are a number of points to consider, however. One should stress to a patient that after surgery their prescription may change as the eye heals requiring several changes in their glasses until the eye stabilizes.

Keratometry readings are important on every pseudophake. The readings reveal corneal topography and the mires may give an indication of corneal health. Distorted mires may indicate dry spots or keratitis and irregular mires can be caused by tight sutures. The readings should be compared pre and post-surgically. If the IOL was implanted recently there is often a significant change, but as the wound heals they generally return to pre-operative levels. If there is a large change that is stable, one should refer back to the surgeon because they can often manipulate the sutures to lessen the problem. Minus cylinder will be induced 90 degrees away from the tight suture.

Retinoscopy also provides some valuable information. The reflex should appear comparatively bright, undistorted, and will provide a good starting point. A reflex that is dull is usually due to capsular opacification or corneal changes. Capsular opacification results in a large neutrality zone while corneal edema gives a reflex that is difficult to neutralize. Also, a reflex with conflicting motions indicates a crossed cylinder component between normal corneal astigmatism and surgically induced astigmatism, possibly due to a tilt of the IOL.

Binocular tests should be included in any exam. This is especially important in the unilateral lens implant patient. The two eyes probably have not been operating binocularly for some time due to the deprivation in one eye and binocular fusion may be limited. Therefore, the clinician should
test fusion, convergence, and stereopsis when applicable.\textsuperscript{34} The patient may need supportive visual training and/or prisms to obtain comfortable fusion.

Any anisometropia needs to be carefully evaluated. Those with aniseikonia need special care. The clinician may need to change base curves, magnification, lens thickness, or add prisms to correct the problem.\textsuperscript{35}

4) BIOMICROSCOPY

The biomicroscope is an essential tool in assessing anterior chamber health, media clarity, and the implant itself. The cornea is the sight of the most frequent complications of IOL surgery. Therefore we must be alert for signs of edema such as Decemet's folds, subepithelial microcysts, corneal thickening, and corneal striae. Generally, all signs of edema should have subsided within 6-8 weeks after surgery. Edema after that point in time should be reported to the surgeon.

A mild keratitis may be present and is usually the result of dry eyes or post-operative antibiotics. Tear supplements can be used in the case of dry eyes and in the case of antibiotics, the surgeon should be notified. Corneal staining should clear up significantly within one week after the initiation of artificial tears or discontinuation of the drugs.

The cornea should also be checked for any precipitates. They may be an indication of an inflammatory reaction, such as uveitis.

The wound area must be evaluated. Tight sutures can cause wrinkles in Decemet's membrane which will form a "V" pointing to the stiches.\textsuperscript{36} The refraction will frequently show corresponding astigmatism. Look for spontaneous fistula blebs which can be caused by leakage of the aqueous from the wound. This can be checked by instilling fluorescein and watching for a
green rivulet that flows from the wound. Fistula blebs are reason for an immediate referral to the surgeon.

Screening for cells and flare is important. Traumatic uveitis is normally expected for about 6-8 weeks after the surgery. Remnants of the lens may be seen. Cortical remnants will appear whitish while capsular remnants will be clear.\(^3\) Pigment may be found, resulting from the surgery or by chafing from the implant. Excessive pigment or debris is an indication for gonioscopy which may also be used to check for peripheral anterior synechiae.

The iris often suffers some trauma during surgery. If pigment epithelium was stripped away by the procedure, there are often areas of iris transillumination. This pigment is often found clumped to the surface of a PCIOL. Long-term care involves monitoring any changes of the atrophy indicating a constant chafing.

With ACIOL's, check the peripheral iris for signs of iris tuck or anterior synechiae. Check the pupil for evidence of an iris prolapse, especially in ICCE procedures.\(^3\) With IFIOL's and ICIOL's, check the clips and sutures for any signs of erosion or iris thinning and iridodialysis.\(^3\) The pupil itself should react to light both directly and consensually. Normally ACIOL's and PCIOL's will have round or slightly elongated pupils. Synechiae or pupillary capture will distort the pupil's shape. With IFIOL's or ICIOL's, a square pupil may be the result due to the connecting sutures used.

Check the position of the implant. Patient symptoms are a good indicator if there is a problem. Reports of monocular diplopia or half fields of clear vision are associated with a decentered lens. Often the lens can be decentered slightly with minimal visual problems but it should be monitored for changes over time. ACIOL's and PCIOL's should show no movement.
when the eye is moved to different positions of gaze. Iris fixated lenses may shake when the eye is moved but the movement should be minimal and not result in diplopia or prolonged blur. This movement is known as pseudophakodonesis.

The implant should also be evaluated for clarity. Any precipitates such as pigment, inflammatory cells, etc. have to be noted. Make sure that there isn't any sign of perilenticular membrane growth. In ECCE procedures check the posterior capsule. Any debris deposition, inflammatory exudates, Elschnig pearls, and fibrotic or cell growth can decrease clarity. If vision is being effected, the patient should be referred back to the surgeon.

5) FUNDUS EVALUATION

With the addition of the implant, the view will be magnified. Adequate view of the peripheral fundus requires dilation, which must be done carefully. With modern ACIOL's and PCIOL's, the pupil may be safely dilated but with iris-fixated lenses, dilation by an Optometrist is not recommended. There is a significant chance for dislocation and if there is some vascularization around the sutures, hemorrhage may occur.

Once dilated, the clinician should look for of posterior uveitis, CME, and retinal detachments. CME may be difficult to diagnose and can only be confirmed by fluorescein angiography. In cases where there is no apparent cause of decreased acuity, it is prudent to refer patients for this procedure.

6) TONOMETRY

Finally, any patient with an implant has to have pressures taken every 6 months. Ocular inflammation, pigment dispersion, pupillary block, possible
steroid anti-inflammatory agents, and angle erosions are some of the causes of secondary glaucoma. Therefore, the patient has to be monitored regularly.

SUMMARY

As Optometrists, it is not only important for us to be able to provide maximum visual functioning and acuity, but also to be knowledgable about the broad spectrum of visual care.

With increasing use of Intraocular Lenses, Optometrists will be seeing more and more of these patients. Therefore, it is essential for O.D.'s to familiarize themselves with this type of surgery and to provide sound advice and quality follow up care for these patients.
BIBLIOGRAPHY


