



Financial disclosure

- Alcon
- Novartis
- Zeiss

- KOL, ad boards, consulting, speaker, travel fees.

Easy - stress free?

- Cataract surgery at top of S development curve
- True Accommodating lenses/risk free multifocal lenses
- Trivialisation of Cataract surgery
- Most complex of Surgical Operations
 - Eyes, Ears, Hands, Feet Required to be co ordinated
 - Deep understanding of Engineering, fluidics with Holistic approach to patients
 - Ultimate goal is for Surgery to be relaxed and flowing as with one with the surgery.

The Journey

- Prevention
 - Sunglasses
 - Drugs, aspirin. Diabetes
 - Vitrectomy – Replacements.
- Patient selection
 - Royal National Institute for the Blind Survey
- Increase in Number of cases
- Private providers Vs NHS
 - Training issues
- Macular Optical Coherence Tomography
 - Screening on all cases
- Laser assisted Surgery
 - Femtosecond laser Costs Vs Advantages
 - Zeiss Luminera 700 – Calisto heads up display
- Wound Size
 - Lens design
- Surgical advancements
 - ICCE to ECCE to Phaco to ?
 - Vision Blue
 - Iris Hooks
 - Capsule tension rings
- Lens Design
 - Aspheric, Single pieces, Square edge
 - Hydrophobic vs Hydrophilic
 - Glistenings
 - Pre Loaded
 - UV Protecting-Clear Vs Yellow
- Monofocal Vs Multifocal
 - The Hype vs the Reality
- Toric Intraocular lens
- Residual refractive error
 - Lens exchange, Piggy back
 - Wave front guided Femtosecond Laser

The Journey

- Phacoemulsification machines
 - Evolution of technologies
 - Centurion
 - Fluidics
 - New software controls on settings
 - Battery fail safe
 - Tips Straight, Flared, Ozil tips, Swan neck tips.
 - Rotational tips
- Uninterruptible power supply
- Intraoperative antibiotics
 - Intracameral
 - Subconjunctival
 - Topical
- Wrong lens selection
- Post operation Medication
 - Steroids, Antibiotics
 - NSAID
- Post operation Review
- Post operation Refraction
- Audit
- Patient satisfaction
- Feedback

Prevention of Cataracts

- Smoking¹ – x3 risk from 27 Studies – Nuclear Cataract formation
 - Alcoholics
- Age, Female, Family History, Race
 - UK² 30% over 65
 - 16% 65 – 69
 - 24% 70-74
 - 42% 75-79
 - 59% 80-84
 - 71% >85
 - India 74% of over 60's in India have had cataracts or operations.
- Genetics – 48-59% heritability
- Drugs – Steroids
- Diabetics

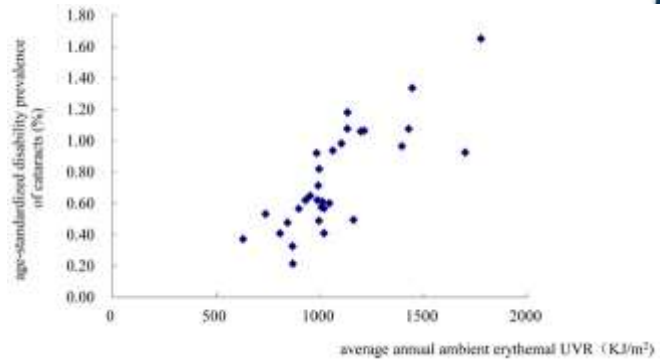
1. J Cataract Refract Surg. 2005 Dec;31(12):2395-404

2. 2010 RCO College guidelines on Cataract Surgery



Does Sun Light Increase risk of Cataracts

- Chinese Study
- prevalence of cataracts and annual ambient erythemal UVR exposure in 31 regions of China
- Showed strong association
- Sunglasses
- Wide Brimmed Hat



The relationship between the disability prevalence of cataracts and ambient erythemal ultraviolet radiation in China. PLoS One. 2012;7(11):e51137. doi: 10.1371/journal.pone.0051137. Epub 2012 Nov 30.



Oxygen theory of cataract formation



Increased exposure of the lens to molecular oxygen causes oxidative damage to proteins in the center of the lens

Nearly 50% of patients undergoing long-term hyperbaric oxygen therapy developed nuclear cataract in 1 to 3 years.

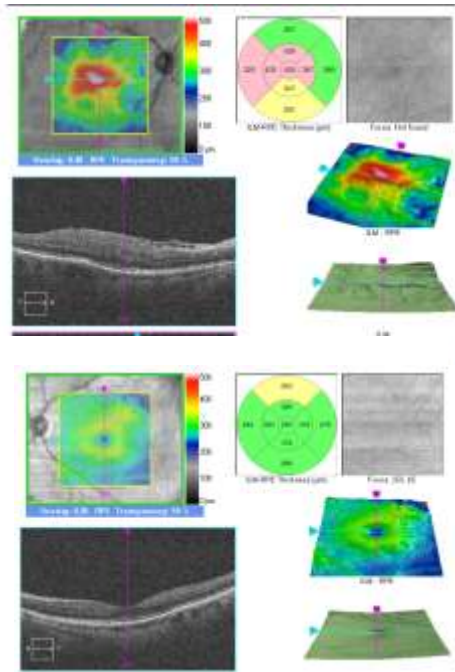
Intraocular oxygen concentration gradients in the posterior segment of the eye are actively maintained by the vitreous body. An intact gel structure is critical to this process. Loss of the structure of the vitreous body, as a consequence of either age related degeneration, myopia or vitrectomy – higher oxygen

- Vitrectomy surgery cataract surgery in 60% to 95% at 2 years
- Vitrectomy surgery, the oxygen gradient is reduced or absent and the lens is exposed to increased oxygen
- Ascorbate in the vitreous decreases exposure of the lens to oxygen
- Vitamin C Intake ??

Arch Ophthalmol. Apr 2009; 127(4): 475–482. The Gel State of the Vitreous and Ascorbate-Dependent Oxygen Consumption Relationship to the Etiology of Nuclear cataracts [Ying-Bo Shui](#). National institute for health information on Vitamin C

Pre Operation OCT

- Undetected Macular Pathology
 - Normal OCT
 - Abnormal OCT
- Unexpected post op visual results
- Corneal topography as well as K's
 - Undetected Keratoconus



Eye Preparation

- Moorfields Eye Hospital
- Tayside
- Betadine 10%
 - BSS Dilution
- Chlorhexidine 0.05%
- Antibiotics
- Minims 5%
 - 80p each



Choice – Choose and Book The New World

Appointment Request



The NHS Constitution gives you the right to start your treatment within reasonable waiting times and sets out what you can do if you think you have waited too long.

Please use this letter to choose and book your appointment.

Booking Reference Number: [REDACTED]

Section 1 - Your details
 Name: [REDACTED]
 NHS number: [REDACTED]
 GP surgery: KING EDWARDS MEDICAL CENTRE, HUNSLIP

Section 2 - How to make your choice and book your appointment.
 The options below can provide further information to help you make your choice. You should also use these options to book, change or cancel your appointment.
 Phone: 0345 30 30 30
 Telephone: 0345 3 33 22 50
 Internet: go to www.chooseandbook.nhs.uk

Closing times are: Monday to Friday 9am to 5pm and weekends and bank holidays 9 to 4pm (closed on Christmas Day). Call charges from landline and mobile networks may vary. You will need your password (printed separately) to book, cancel or change your appointment. If you do not have your password, please contact your referring practice where a member of the practice team can help. You do not need to see your GP.

Section 3 - Your choices
 Please book your appointment for **ONE** of the following choices.

- Adult Cataract Clinic - Bishop Wood-BMI-NT4
BMI - BISHOPS WOOD
 Make your booking by phone or internet - see Section 2 above for details.
- Adult Cataract Clinic - The Clementine Churchill - BMI - NT4
BMI - THE CLEMENTINE CHURCHILL HOSPITAL
 Make your booking by phone or internet - see Section 2 above for details.
- Adult Cataract Clinic-The Garden-BMI-NT4
BMI - THE GARDEN HOSPITAL.

Section 3 - Your choices

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BMI - THE GARDEN HOSPITAL.

Make your booking by phone or internet - see Section 2 above for details.

- Adult General Ophthalmology-Ashford & St Peter's Hospitals NHS FT-Heart of
 Hounslow-RTK
HEART OF HOUNSLOW
 Make your booking by phone or internet - see Section 2 above for details.
- Cataract-Moorfields at Ealing-RP6
MOORFIELDS AT EALING HOSPITAL
 Make your booking by phone or internet - see Section 2 above for details.
- Eye General Clinic - Eye Dept-Hillingdon Hospital Trust-RAS
HILLINGDON HOSPITAL
 Make your booking by phone or internet - see Section 2 above for details.
- General Eye Clinic-OPD-Mount Vernon Hospital -RAS
MOUNT VERNON HOSPITAL SITE
 Make your booking by phone or internet - see Section 2 above for details.
- General Ophthalmology-Ophthalmology Edgware Community Hospital-RA
EDGWARE COMMUNITY HOSPITAL
 Make your booking by phone or internet - see Section 2 above for details.
- One stop Cataract Service -The Hillingdon Hospital Foundation Trust-RAS
HILLINGDON HOSPITAL
 Make your booking by phone or internet - see Section 2 above for details.
- Ophthalmology Cataract Clinic - ACAD Centre - RVS
AMBULATORY CARE & DIAGNOSTICS CENTRE
 Make your booking by phone or internet - see Section 2 above for details.
- Ophthalmology Cataracts-Watford Outpatient Eye Dept-West Herts Hospitals-
 RWS
WATFORD GENERAL HOSPITAL
 Make your booking by phone or internet - see Section 2 above for details.

Under the NHS Constitution, you have the right to start non-emergency, consultant-led treatment within 18 weeks from referral - or where cancer is suspected, to be seen by a specialist within two weeks of urgent referral. To find out more visit www.nhs.uk/nhsconstitution, or ask your GP.

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The Cataract Refractive Suites

Alcon



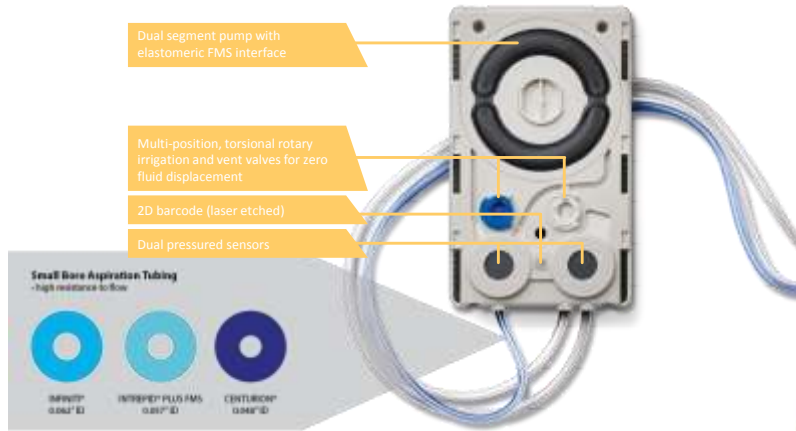
Zeiss



New Alcon Phaco Machine Centurion Alcon



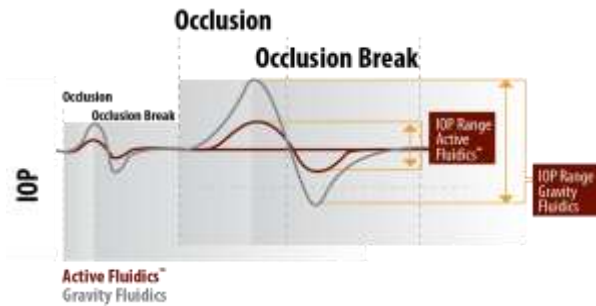
Active Fluidics™ Technology



Active Fluidics™ Technology

Occlusion Break Surge Comparison

The Active Fluidics™ system results in reduced occlusion breaks compared to procedures using gravity fluidics¹.



1. Data on File, Alcon Laboratories.

Active Fluidics

For Phaco Procedures	CENTURION [®] Vision System		INFINITY [®] Vision System
Fluidics	Active 	Gravity	Gravity
Fluidics Maintained During Procedure	Software Observations - Software Warns to Maintain Target IOP	Surgeon Observations	Surgeon Observations
Pressure Monitored	Software Warns to Maintain Target IOP	Irrigation & Aspiration	Irrigation & Aspiration
IOP Ramp	Yes	No	No
Customized Patient Eye Level	No	Yes	Yes
Irrigation Pressure	Software Warns to Maintain Target IOP	Bottle Height	Bottle Height
Irrigation Factor	Yes	No	No
Aspiration Pump	Balanced Dual Segment Peristaltic	Balanced Dual Segment Peristaltic	Single Segment Peristaltic
Leakage Compensation	Yes	No	No

Active Fluidics[™] is the very current technology that accounts for key fluidics variables.



Active fluidics

- Consistent chamber stability
- iop vs bottle height
- Reduced post surge spike

Active Fluidics[™] vs. Gravity Fluidics



The Active Fluidics[™] system reduces fluctuations in IOP compared to procedures using gravity fluidics.

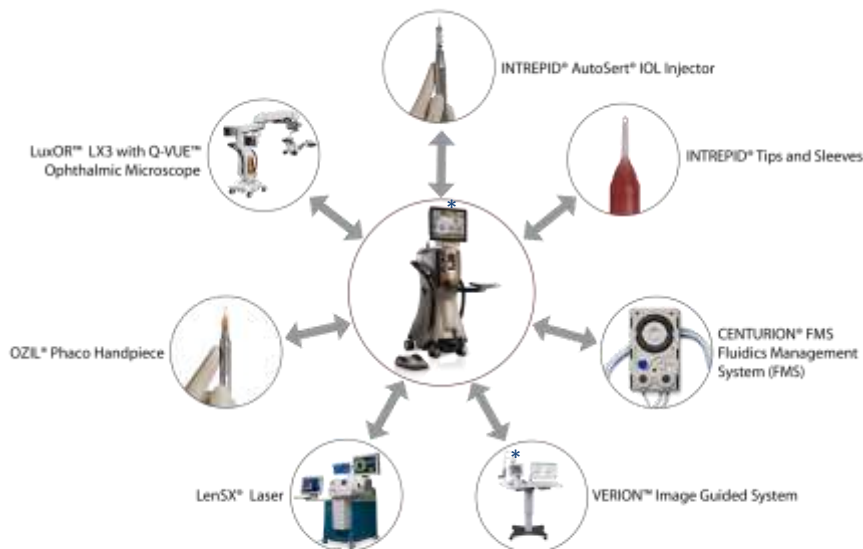


My Experience

- Very familiar interface
- More customisation
- Footpedal Wireless
- Backup Power Supply!
- Anterior Vitrectomy Solid stability
- Ozil compatible
- New Swan tip to try



Applied Integration™



Femtosecond Laser – The Future?

Slow uptake in UK

- Cost, lack of experience/Training
- Not available in NHS
- Extra space/rooms
- Real advantage or Disadvantages?
 - Perfect wounds, Rhexis, Re chop lens


Study showed no difference in

- Unaided visual acuity (70% 6/6)
- Endothelial cell loss
- Less Phaco energy 3.8 vs 5.5 US
- Longer time 9.3 vs 8.0 mins



[Ophthalmol.](#) 2014 Jun 2 Endothelial cell loss and refractive predictability in femtosecond laser-assisted cataract surgery compared with conventional cataract surgery. [Krupp T](#)

Microscopes



OPMI LUMERA 700 and RESCAN 700
A new dimension in visual cortex

Innovation in eye care starts with the desire to see more. With the first surgical microscope and the first commercial OCT for ophthalmic application, two gold standards have now been fused together. PII (eye) retina - capturing in a way all of surgical microscope.

See more:

- Risking surgery
- with real-time HD-OCT
- for better decision making


DOCUMENTATION

WORKFLOW SUPPORT

INNOVATIVE ASSISTANCE FUNCTIONS

SURGERY

OPMI LUMERA 700 Display of visual assistance functions CALLISTO eye



Incision/LRI assistant

- Superimpose templates of planned incisions and litoral relaxing incisions for surgery.

Rhexis assistant

- Superimpose scalable rings to assist achievement of the capsulorhexis of optimal size and shape.

Eye tracking

- Track eye movements with CALLISTO eye. This ensures the position of the superimposed assistance functions are adjusted in real-time to take eye movement into account.

Z ALIGN –toric assistant

- Reference and target axes on screen and in the eyepiece support more precise alignment of toric IOLs.*

K TRACK

- Visualize corneal curvature combination with a keratoscope.

View data in the eyepiece

- View superimposed assistance functions in the eyepieces of the surgical microscope so you gain the clinical benefits of the graphical overlays without needing to look away from the surgical field.

When the lights go out!

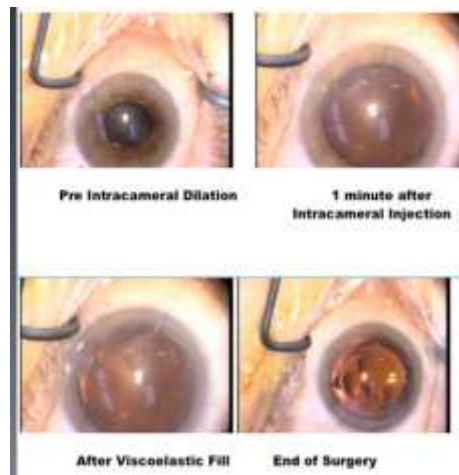
- Regular Irregular Event
- Predictable
- Risk Assessment
- Patient Safety
 - No Microscope light
 - No Fluid, No Phaco
- Recovery time?
 - 15 seconds to 20 minutes
- Medical Grade UPS £704
 - Long enough to finish operation



Tripp-Lite SMX1200XLHG uninterruptible power supply (UPS)

Pupil control

- 1 Drop Phenylephrine
2.5% to 5 or 10 of BSS
- Moorfields Eye Hospital
0.125% Phenylephrine
- Iris Hooks
 - Oblong
 - Round



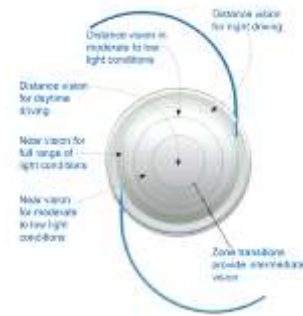
Iris Hooks/Expanders



- "I never regret using Iris hooks"

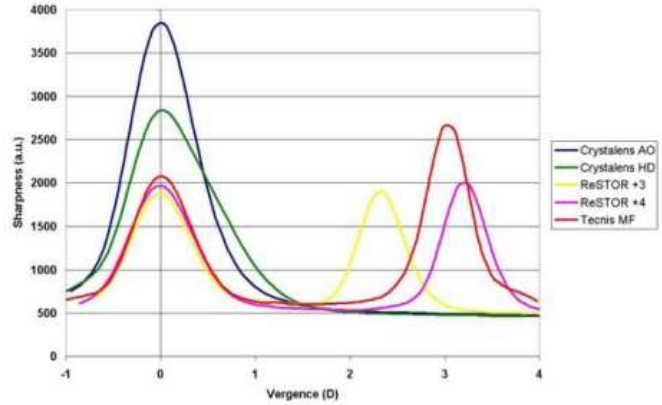


Lens Designs



Monofocal Vs MultiFocal vs Accommodating

- Perfection not achieved yet
- NHS not approved
- Privately Small numbers
- Patient satisfaction ?
- Holy grail
 - Preloaded, <2.4mm, low failure rate, Low PCO, No glistenings, Wide range of powers, good near and distance vision.



[Trans Am Ophthalmol Soc](#), 2011 Dec;109:221-31. Comparison of through-focus image quality across five presbyopia-correcting intraocular lenses [Pepe JS](#)¹, [Wang D](#), [Altmann GE](#).

An Adjustable IOL for Customizable Results

This lens offers a noninvasive approach to improving cataract surgical outcomes.

BY FRITZ H. HENGERER, MD, PhD

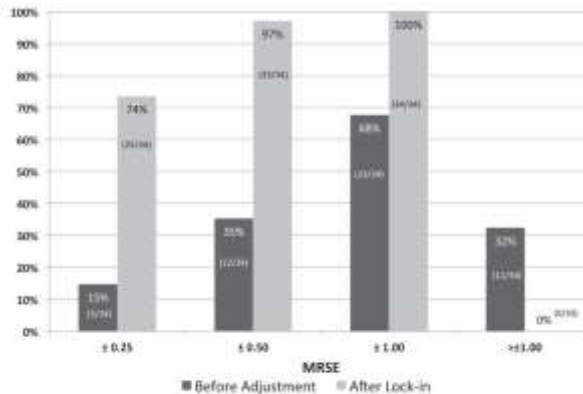


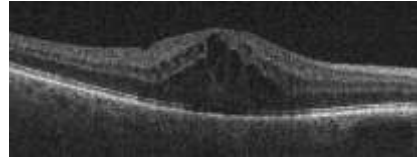
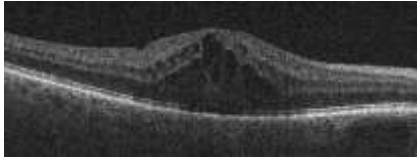
Figure 2. Bar graph showing the reduction of manifest refraction spherical equivalent (MRSE) in 34 postrefractive surgery eyes implanted with the light-adjustable lens.

Lawrence Bireley Ophthalmology 2013 1-5

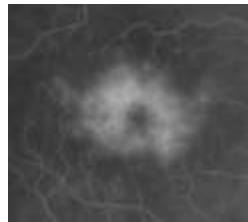


Figure 1. The Light Adjustable Lens.



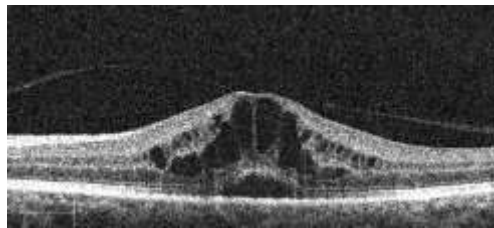


CMO/CME in the Phaco era Myth or Reality



Definition

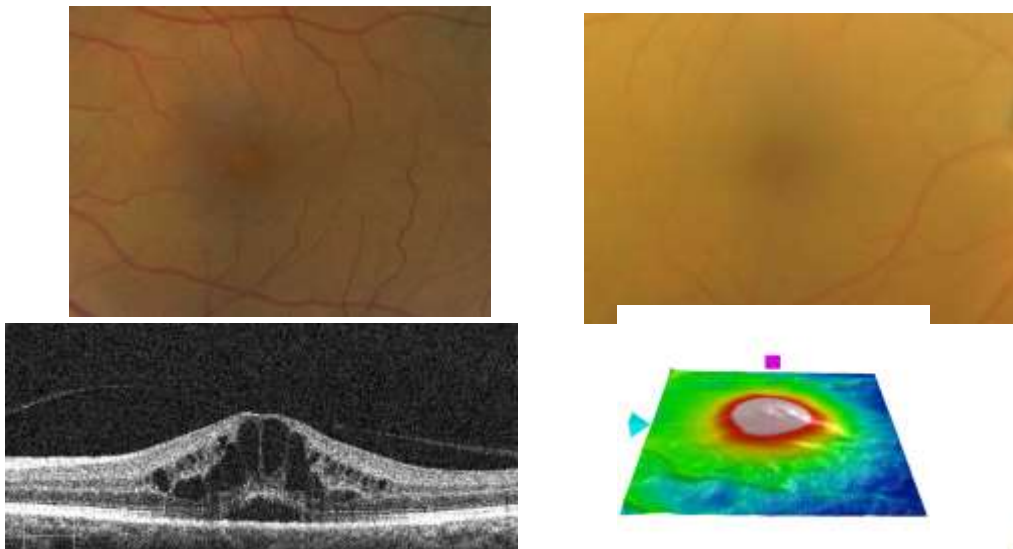
- Cystoid macular oedema (CMO) is a painless condition in which swelling or thickening occurs of the central retina (macula) and is usually associated with blurred or distorted vision.
 - Slit lamp biomicroscopy reveals blunted or irregular foveal light reflex, retinal thickening, and/or intraretinal cysts in the foveal region.
 - OCT /FFA Characteristic
- CMO is a relatively common condition, Thus consider differential eg.
 - Wet AMD
 - Uveitis, eye injuries,
 - Diabetes, Vein Occlusions
 - drug toxicity etc .
- CMO developing/related to Cataract surgery is referred to as **Irvine-Gass syndrome**.



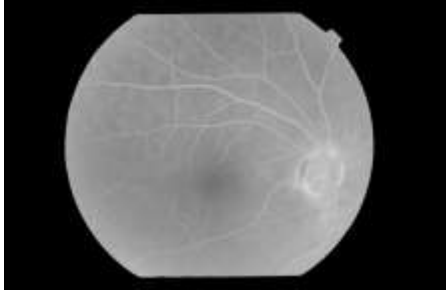
Incidence

- Depends on Methodology used to detect
 - FFA
 - OCT
 - Symptoms – Vision
 - Prophylactic NSAID, Post op NSAID/Steroids
- Intracapsular Surgery – 60%
- Extracapsular Surgery – 20-30%
- Phacoemulsification
 - Routine cases 3%
 - Complicated cases - 4 -13%

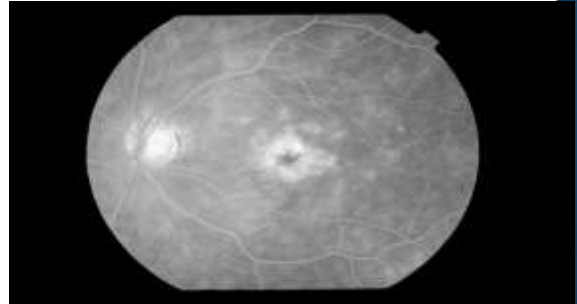
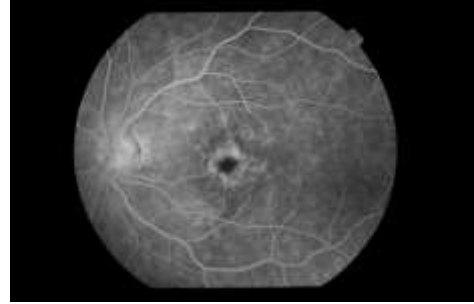
Nelson ML Managing cystoid macular edema after cataract surgery : Curr Opin Ophthalmol 2003;14:39-43
Lobo C. Pseudophakic Cystoid macular Edema Review: Ophthalmologica 2012;227:61-67



69 Year old GP Female 8 weeks post uncomplicated Phaco Surgery
Pre op Vision 6/24
Post op 3 weeks 6/6
8 Weeks post op 6/24



FFA

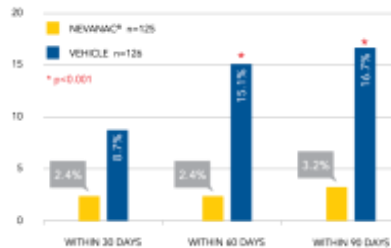


Petaloid Leakage with Optic Disc leakage

CHOOSE AN EFFECTIVE WAY TO IMPROVE DIABETIC PATIENT OUTCOMES

RESULTS

Patients developing
clinically significant
macular oedema¹
after cataract surgery (%)



Adapted from Singh et al (reference 3)

¹ defined as an increase of 30% or more in central subfield macular thickness relative to the presurgical baseline measurement

NEVANAC® demonstrated statistically significant and clinically relevant advantages compared with vehicle in preventing macular oedema in diabetic retinopathy patients following cataract surgery³
Prescribe as a prophylaxis before and after cataract surgery^{1,2}

Nepafenac Approval – Diabetic Patients NSAID



All Wales Medicines Strategy Group
Grŵp Strategaeth Meddyginiaethau Cymru Gyfan

Final Appraisal Recommendation
Advice No: 1813 – July 2013

Nepafenac (Nevanac®) 1 mg/ml eye drops, suspension

Submission by Alcon Laboratories (UK) Ltd

Recommendation of AWMSG

Nepafenac (Nevanac®) is recommended for use within NHS Wales for reduction in the risk of postoperative macular oedema associated with cataract surgery in diabetic patients.



Home > SMC Areas > Areas > SMC Areas (Detailed) > SMC Areas (Detailed)

- SMC Advice Strategy
- Meeting Dates
- Public Access Schedules
- Following Submissions

Briefing note: nepafenac (Nevanac)

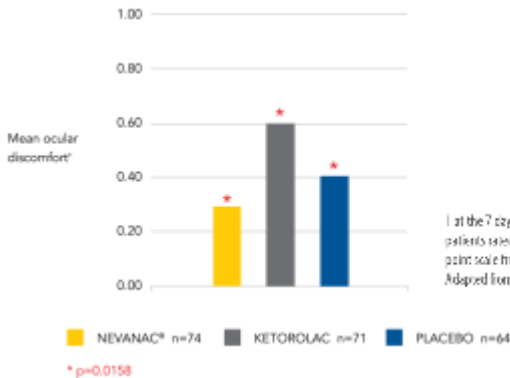
SMC accepted registration for reduction in the risk of postoperative macular oedema associated with cataract surgery in diabetic patients.

- Macular oedema is a swelling of the retina at the back of the eye and is a possible side effect of surgery to remove cataracts in people with diabetes.
- Nepafenac is a type of medicine called a non-steroidal anti-inflammatory drug that is used as eye drops to reduce pain and inflammation in the eye. SMC cannot yet recommend advice for registration for the prevention and treatment of postoperative macular oedema associated with cataract surgery in diabetic patients. This submission refers to a generic application for cataract surgery in and to reduce the risk of postoperative macular oedema in patients with diabetes who are undergoing cataract surgery. It is given three times daily as eye drops in the affected eye, beginning 1 day prior to surgery and continuing up to 14 days following surgery, to reduce the risk of macular oedema. An additional drop should be administered 12 to 172 minutes prior to surgery.
- It is only for those that register. It is only for those that register. It is only for those that register. It is only for those that register.
- It is only for those that register. It is only for those that register. It is only for those that register. It is only for those that register.
- SMC accepted registration for reduction in the risk of postoperative macular oedema associated with cataract surgery in diabetic patients.

- England - Approved in many but not all hospitals
- No national system
- Application by every hospital/district

ALL WITH PATIENTS' COMFORT IN MIND

By day 7, NEVANAC® was as comfortable as placebo and significantly more comfortable than ketorolac 0.5%⁸



At the 7 day visit, after drop installation, patients rated mean discomfort on a 5 point scale from 0 (none) to 4 (severe). Adapted from Vardi et al (reference 8)

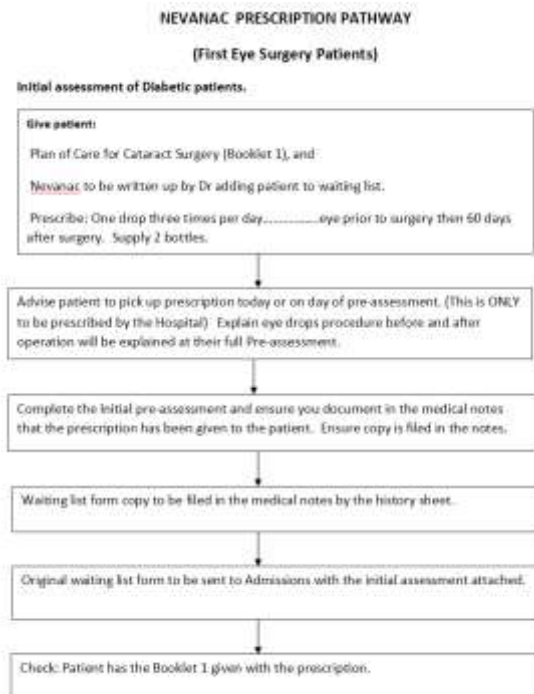
Prevention of CMO

84% are not Diabetic

- NSAIDs more effectively prevent CME after cataract surgery compared with corticosteroids
- Lack of randomised controlled trials Evidence
- ESCRS PREMEDIATION study population consists of 1,050 patients without diabetes and 300 patients with diabetes mellitus who require cataract surgery in at least one eye
- NSAID arm included
- 2015 Results

The Hillingdon Hospital regime for non diabetic standard risk patient
 Post operation Tobradex four times a day for a week, twice per day for a week and stop
 Bromfenac twice per day for one month and stop, continue another month if high risk
Clinically significant CMO pre regime 50 cases per year Post Regime – 0 – Zero!

<http://escrs.org/publications/eurotimes/12October/CME-PREVENTION.pdf>



NEVANAC PRESCRIPTION PATHWAY
(For Telephone POA Patients)

To use prep pack for Diabetic patients.



WEEK 1 NAPAFENAC (Combined Pain & inflammation) DIABETIC patients only Use as instructed 3 times a day				WEEK 2 NAPAFENAC (Combined Pain & inflammation) DIABETIC patients only Use as instructed 3 times a day			
	Break	Lunch	Tea		Break	Lunch	Tea
	fast				fast		
Monday				Monday			
Tuesday				Tuesday			
Wednesday				Wednesday			
Thursday				Thursday			
Friday				Friday			
Saturday				Saturday			
Sunday				Sunday			

HOW TO USE NEVANAC®	30-120 min prior to surgery	AM	NOON	PM
DAY PRIOR TO SURGERY		1 drop	1 drop	1 drop
DAY OF SURGERY	1 drop	1 drop	1 drop	1 drop
To prevent and treat postoperative pain and inflammation UP TO 21 DAYS As directed by the clinician		1 drop	1 drop	1 drop
To reduce the risk of postoperative macular oedema in diabetic patients UP TO 60 DAYS As directed by the clinician		1 drop	1 drop	1 drop

Note: Tick box on chart after you have put in drops.

Your drops will be enough to complete the full 60 days.

Please leave 5 minutes between the two types of drops you will be using.

Post Operation

- Posterior capsule opacification
 - Life long figures 2% to 40%
- Long term complications
 - Retinal detachments x4
 - Wet Age related macular degeneration ?
 - Diabetic Retinopathy
- Surgical Complications
 - Endophthalmitis 0.3% to 0.013% ESCRS
 - PCR - <1%
 - Endothelial cell loss -? Issue?
 - Minor risks, Inflammation, sutures, irritation, sub conjunctiva haemorrhages
 - Equipment failure
 - MHRA Reports
 - Contingency plans for all possibilities

Never Event

- Wrong Intraocular lens insertion
 - Ophthalmic based WHO check list
 - Paranoia ! – Double checking
- Refractive surprises
 - High Myopes or Hypermetropes
 - Corneal scars, Keratoconus etc..
 - Post refractive surgery
 - Intraocular lens exchange
 - Sulcoflex
 - Wave front Femtosecond Laser correction



Elimination of Endophthalmitis

- Rx Blepharitis per op
- 3 mins Iodine
- Sealed wounds – 10 Vicryl Suture, Glue
- Intracameral Cefuroxime
 - Sub Conjunctival Vs Intracameral
 - 2008 Sunderland Eye unit X3 reduction
 - ESCRS Study x5 reduction 0.03%
- ?post op Antibiotics

J Cataract Refract Surg 2008; 34:447–451 Q 2008 ASCRS and ESCRS



Conclusion

- The beauty and elegance of the Surgery hides the complexity and risks inherent in Modern surgery, trivialise the operation at your peril.
- Keep updated, Keep Learning, Keep striving for the best outcomes. Courses, On line videos, Conferences, Journals, Google, WEB, PubMed, Company Reps.
- Know your limits – A problem shared is a problem halved, no shame in calling in a colleague for advice.
- Prevention is better than cure – use a NSAID, UPS
- Audit outcomes and make changes

Handout from <http://www.nicholaslee.co.uk/hopsitallinks.html>

