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CATARACT SURGERY IN ANIMALS

Dear Client,

This leaflet is designed to give you a very clear overview of cataract surgery in animals and it should assist you in making a decision about elective cataract surgery for your pet as well as deal with many of the questions owners may ask. It is our intention to assist you in gathering as much information prior to your pet's surgery so that you are fully informed. Please take the time to read this information as well as feel free to consult the many websites references we have supplied in this document so that you get a fair overview of cataract surgery from other independent sources. The ophthalmologist genuinely wants you to understand what can be done for your pet and we strive to inform you, as well as perform a successful surgery as best we can. Our intention is to improve your pet's visual capabilities.

This document will cover the following:

- What is a cataract and what causes cataracts.
- Pre-operative check list
- The surgical procedure [phacoemulsification surgery]
- Post-operative results and potential complications
- Home care and post-operative treatments
- Websites

What is a cataract and what causes cataracts:

The lens is made mostly of water and protein. The protein is arranged to let light pass through and focus on the retina. Sometimes some of the protein denatures due to metabolic changes and starts to form small areas of opacity in the lens and loss of transparency occurs. Thus, by definition a cataract is opacity of the lens. Over time, the cataract may grow larger and cloud more of the lens, making it difficult for your pet to see.

No one knows for sure what causes cataracts in animals but many possible causes have been speculated.

These may include;

- Hereditary [genetic] predisposition in certain breeds
- Secondary to severe inflammation [uveitis] in the eye.
- Following some form of blunt trauma or even perforating foreign body which can strike the lens.
- Radiation following irradiating cancers near the eye.
- Electrocution following a pet biting an electrical cable.
- Secondary to ageing [senile cataracts]
- Following medical conditions like Diabetes

Pre-operation checklist:

It is important for us to ensure that your pet is healthy prior to an elective surgical procedure like this. Many patients with cataracts are in fact diabetics and thus are more likely to have anaesthetic problems. Careful assessment of the health of the animal is very worthwhile. The following assessments may / will be performed or requested prior to surgery.

Ophthalmic exam	General clinical exam
Dental examination	Blood glucose [If Diabetic]
Blood chemistry	Haematology
Other tests	

Should your pet have any known specific medical challenges then please inform the attending ophthalmologist and also supply any regular medication at the time of admission to hospital for the cataract surgery.

Before surgery is performed it is important to evaluate retinal function and this is done by electroretinography. An ocular ultrasound must also be performed to establish that there is no pathology in the posterior segment of the globe. Both tests are performed a few days before the surgery [normally on Wednesdays] and following successful tests the patient will be medicated with oral Petcam / Metacam and topical Maxitrol eye drops [1 drop 3x/day]. Should the patient be coming from a far distance [greater than 4 hrs drive] to our hospitals then these tests would then be performed on the Tuesday prior to the Wednesday surgical date. It is imperative that the referring vet would have dispensed and initiated the above medications. Having these tests performed on the Tuesday is an exception and these cases must specifically be arranged beforehand with our hospital staff.

The Surgical Procedure:

Once it is decided that the patient has a cataract the treatment is essentially surgical and the only question that arises is when? If there is visual impairment then surgery should be arranged at the client's earliest convenience. It is not a good idea to wait months or years as the lens progressively gets harder and technically this may result in a more laboured surgery with greater risk of complications. The concept of waiting for the cataract to "ripen" or "mature" is no longer applicable. However, in certain cases where there are associated complications or potential risks of complications, an early (even urgent) operation may be required - here the ophthalmologist would advise you.

A cataract can only be removed or treated by surgery and not by medications as is commonly thought. Techniques in man and animals have progressively improved over time and the current method for cataract removal is by a process called **phacoemulsification**. This is not laser treatment.

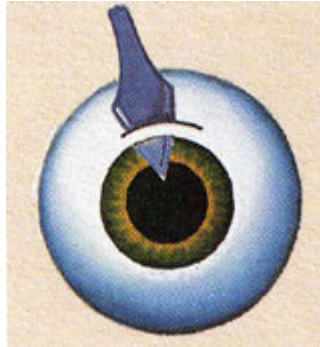
Step 1:

Cataract surgery in animals is performed under general anaesthesia as the patient must be absolutely still. The patient is carefully positioned on its back under the operating microscope and the eye area is surgically prepared [fur clipped short]. Anaesthesia is maintained using gas anaesthesia which is the safest. Monitors are connected to the patient to assist a safe as possible anaesthesia.

Step 2:

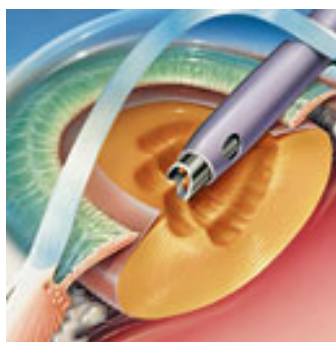
A clear corneal incision [3.2mm] is made with a special corneal blade and a few drops of adrenaline are injected into the eye to create immediate dilation of the pupil so that the lens becomes visible and the surgery can be performed safely through the dilated pupil. Following this, a blue dye is irrigated into the eye

to assist in identifying the thin lens capsule. When this dye is irrigated out it may cause temporary blue staining of the patient's fur around the eye. In order to protect the delicate single layer of cells that line the inner surface of the cornea, a thick viscous solution is then injected into the eye.



Step 3:

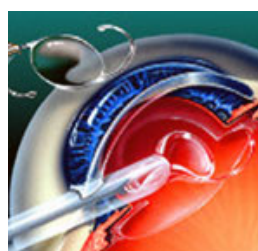
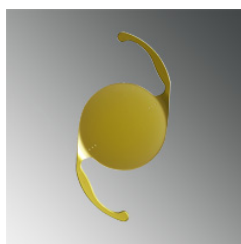
A fine needle is introduced into the eye and a stab incision is made into the anterior lens capsule. A small circular piece of the lens capsule is removed. This has now opened the lens and the cataract can now be removed by **phacoemulsification**. This technique uses the energy of sound waves (high frequency ultrasound) to soften and break up the cloudy lens into a soft pulp so that it can be removed through the aspiration port of the instrument. The surgeon cleans out all visible lens fibres using a combination of the phaco energy as well as an irrigation / aspiration instrument. The latter is used especially to carefully remove lens fibres off the delicate posterior lens capsule. This is referred to as “polishing”. In many cases with dogs the posterior lens capsule still remains scarred and opaque which will inhibit the animals vision. If this scarring is severe then a small tear will intentionally be made in the capsule and the thick jelly [vitreous] filling the back cavity of the eye may push forward slightly and move the opacity out the visual axis. In some cases the posterior capsule may also tear during surgery. This capsule is only a few microns thick anyway! Besides polishing there is no other effective method to remove all the lens fibre cells. These potentially can re-grow and form what is referred in people as “posterior capsular opacity” or PCO and is probably the single most common long term complication of cataract surgery in man and animals. In man it may be removed by laser surgery.



Step 4:

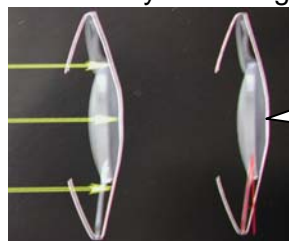
When an owner has elected for the placement of an intraocular lens [IOL] then the small artificial lens is placed into a small introducer sleeve and this folded lens is then injected into the lens capsule. As the IOL is injected into the capsule, the IOL then springs open into its original shape and maintains its magnifying

power. The IOL is then positioned carefully within the lens capsular bag. It is obvious that should the delicate posterior lens capsule be torn or has had to be removed due to opacities as mentioned above in Step 3, then no IOL can be placed otherwise the IOL will fall through the capsule bag into the large back chamber of the eye.

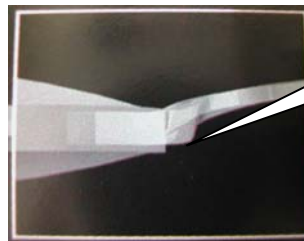


For many years animals have had cataract surgery without IOL's and have done very well in most cases. They will just remain a little more longsighted. **IOL's seem to improve the patient's vision but are not absolutely essential to a successful post-operative result to improved vision.**

Most veterinary ophthalmologist currently believe that placing an intraocular lens [IOL] into a dog's eye is advantageous not only for improving the visual status more towards normality but what seems to be more important is that the modern lenses we use have a square edge that makes contact with the remaining posterior lens capsule. This assists in preventing the re-growth of lens fibre cells across the posterior lens capsule. The IOL also keeps the lens capsule taught and both these concepts reduce cell growth. This growth of cells is known as **Posterior Capsular Opacity – PCO**. The re-growth can easily cause a visual problem. Sometimes this can develop rapidly [weeks to months] or years. The incidence of this phenomenon in people is close to 50%. Besides the polishing process we undertake during phaco surgery there is currently no known method in human and veterinary ophthalmology to stop this re-growth of cells. In man, this opacity is frequently removed by laser surgery.



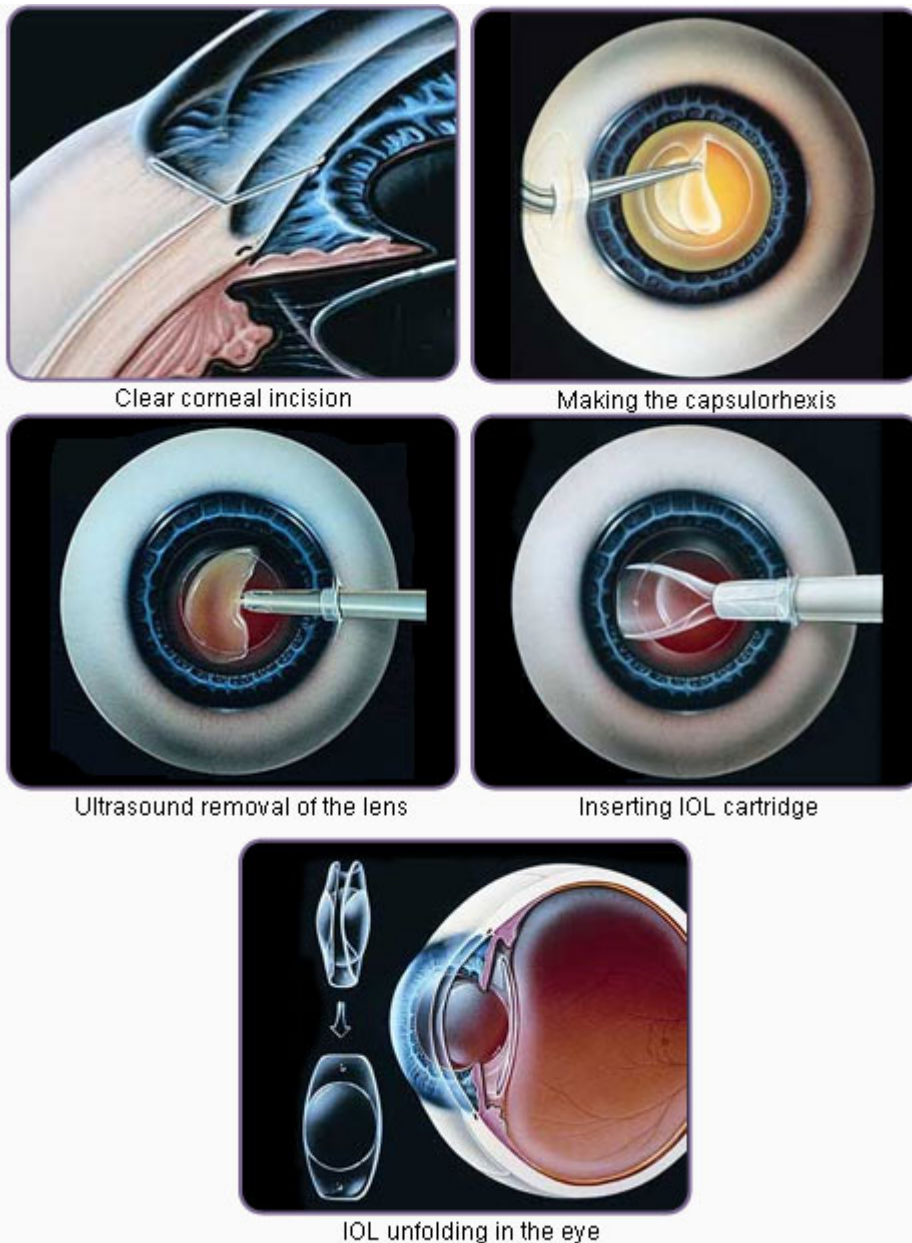
IOL keeps the posterior lens capsule taught



Square edge to IOL

For decades cataract surgery in animals has been conducted without placing IOL's. There are still many dogs that do not receive an IOL, either electively by the owner or the surgeon may find during surgery that it is **not to the patients benefit to place a lens**. Remember it is our goal to give the patient the best opportunity for a successful surgery and improved vision. Excessive client emphasis placed on having or not having an IOL is irrelevant. Dogs that electively do not receive IOL's in spite of a perfectly normal surgical procedure seem to manage very well after a few days. The brain needs to adapt to the long sighted eye. Very close up vision will always be blurred. It's amazing how well these patients' still manage. Without a lens [IOL], the PCO may develop easier as the capsule may become wrinkled. It is also important to realise that much of the activity of animals is based on their very good hearing and smell.

The diagrams below show the sequence of steps as described in the text above:



Post-operative results and potential complications:

Post-operative results: Because the focusing device, namely the lens has been removed, patient's will be longsighted post operatively and this means that objects close up, within a metre or so will always appear blurred even when an IOL has been placed. We also know that there seems to be an adaptation period for a few days after the surgery in which possibly the brain adjusts to the longsighted eye. **Patients vary a lot in their response to improved vision post operatively so we find that some animals show improved sight within hours whilst others may take several days to show significant improvement. Improved vision should be seen within the first 7 days post-surgery.** Many cases do see well after 1-2 days and this would still be considered quite normal. Placing an intraocular lens allows animals to see better sooner and this alone is a major advantage. **If your dog appears to be “blind” after collection the day after surgery, this does not necessarily mean there is a post-operative complication.** It is critical that owners understand this concept. It is impossible to achieve perfect vision as we would know it. Getting your pet more visual to negotiate furniture better or be more confident in moving about is the goal. Do not expect your pet to be catching small food items out the air or seeking small items thrown to the floor. If it does do this well, consider that a bonus. A successful animal surgery will result in a more functional pet.

Post-operative complications:

Phacoemulsification is the most successful technique available today for cataract removal and the procedure generally is very successful with most patients resulting in improved vision. The intention of cataract surgery in animals is for the patient to lead a more normal life than before surgery. All animals react differently after surgery and some may take longer to recover vision than others. Since this is an **elective surgery** and not a necessity we feel it is very important for you to be aware of potential complications. The discussion below is not intended to frighten you but to enlighten you of possible risk factors. This is delicate surgery, involving a delicate organ in the body. The potential complications presented below are similar to what could happen after cataract surgery in people.

Little has been published regarding the very long term visual outcomes from this type of surgery in dogs but based on the many potential problems that can develop in the eye based on the patient's healing response it would be naive to think that a patient will remain visual for life when the surgery is conducted as a young dog. Many dogs do, but there are certainly a host of problems that can develop over time.

There are fortunately not many complications that occur intra-operatively when surgery is done by an experienced phaco surgeon but **most issues that result in reduced vision post operatively are related to the patient's actual later response to the development of intraocular inflammation.** Remember one is opening an organ that is extremely sensitive to inflammation. The status of the eye before surgery [such as adhesions, previous history of uveitis etc.] or changes within the eye that are discovered during surgery [scarring, adhesions, lens zonules damage, extremely hard lens etc.] all play an enormous role in the final outcome or success. The latter factors may affect the owner's expectations of the procedure and have absolutely nothing to do with the surgical technique whatsoever. We never present the concept that a patient will have perfect vision as we know it. That is definitely is an unrealistic expectation. It would be considered successful if the patient has improved vision and activity following surgery.

Serious complications are rare but are worthy of noting, so one realises that should these occur, they could lead to failure of vision. Some complications could include:

- **Uveitis [inflammation]** - All patients will show some degree of inflammation [uveitis] since the most delicate organ in the body, the eye has been opened. Patients will be treated with medications to prevent inflammation in the eye pre-operatively and the duration of medication post-operatively can vary a lot. Very rarely the inflammation may be difficult to control and this may lead to discomfort or even failure to restore vision or may require long-term treatment. Some animals will mount a more severe post-operative inflammatory response than others. Most cases the response is patient specific. It is well recognised that some patients may require long term, low dose oral or topical medications and in the rare occasion this may be for life. Diabetic patients seem to have a higher incidence of requiring longer term medication.
- **Posterior synechiae** are adhesions of the iris or pupil margin to the remnants of the lens capsule. This occurs more commonly if there is uveitis and a very constricted pupil present and this leads to adhesions developing. It can also occur spontaneously. This may cause the pupil to grow closed and occlude the pupil. This complication may be difficult to improve. Intermittent use of Atropine or Mydracil may be required.
- **Retinal detachment** – intra-operative retinal detachment is a rare phenomenon but there statistically is a greater incidence of retinal detachment following cataract surgery. There is very little one can do to re-attach the retina in animals [unlike in man] and an affected eye will most likely remain blind. Retinal detachment may also occur secondary to advanced uveitis as a result of inflammatory cells being released between the choroid or vascular layer lying directly below the retina. This inflammation can cause the detachment. This would also result in a blind eye in most cases.
- **Bleeding in the eye** – this is also rare but could occur intra-operatively, as a result of a difficult surgery, adhesions in the eye, damage of the iris or most commonly post operatively when the dog is back at home and is playing rough with other animals. If you see blood in the eye, please bring this to the attention of the ophthalmologists as soon as possible. Any blood in the eye no matter what the cause can result in further problems such as inflammation, blockage of the pupil so affecting vision, lead to adhesions of the iris, and even affect drainage of the fluid in the eye leading

to glaucoma [raised pressure]. Topical and oral medications usually have limited effect in treating intraocular blood clots.

- **Dullness [edema]** of the cornea. This most commonly is seen in older patients or patients that have very hard lenses. Longer surgical time required to fragment the cataract can lead to a dull cornea. This may be a permanent change. This is exactly why phacoemulsification should be done on immature or recent cataracts and not wait for “ripening or mature” lenses as was the concept decades ago.
- **Posterior capsular opacity [PCO]** - Some patients may have remnants of lens fibres re-growing and forming a scar which can interfere with the visual axis and cause reduced vision. There is no known method of completely preventing this occurring. In man this is a common problem for many patients and in fact it is estimated that about 30-50% of people will develop posterior capsular opacities following their cataract surgery. In people this problem could potentially be rectified by entering the eye a second time and aspirating these fragments or cutting the offending tissue away. Laser can also be used in some cases. It has been found that the incidence of this scarring is lower in animal patients that have had an intraocular lens placed. The modern intraocular synthetic dog lenses have a specially designed square edge which has been shown to limit the re-growth of the posterior lens capsule fibres and aids in maintaining a clear visual axis. [See Figures above under **Step 4**].
- **Endophthalmitis** is a serious infection of the intraocular tissues, usually following intraocular surgery, or penetrating trauma. This is also fortunately very rare in animals.
- **Glaucoma** [raised pressure] may occur and it may be very difficult to control. It is usually associated with inflammation. In some patients, the intraocular pressure may remain so high that blindness may ensue or the globe may require removal altogether.
- **Displacement or dislocation** of the intraocular lens implant may rarely occur.

These are the main potential problems as a result of the body's response to surgery. There may be other more unusual or incidental problems that may occur following surgery as could happen with any patient undergoing a surgical procedure. Here we refer to anaesthetic problems etc.

Home care and post-operative treatments:

1] Home care:

Once your pet is back at home, it is in your hands. At the time of discharge from our clinic we shall carefully explain all the medications and treatments that your pet requires. We trust that you will medicate as we have requested and that at any time that you are unsure to please contact your veterinarian or our staff for assistance. You will be given a chart that presents the post-operative treatment program in an easy to follow manner. Your pet may also have a plastic Buster Collar which will prevent your pet from scratching the eyes. This should remain on at least until the first postoperative check up or until you judge that the pet will no longer want to scratch the eyes. We advise that when the collar is removed, you be at home on that day. If there is build-up of some mucous around the eye this may be wiped away with damp cotton wool. Do not abraid the cornea nor rub the area where the incision site and minute sutures are located. The cornea will be slightly dull or even infiltrated by fine blood vessels around the sutures closing the incision site. This a quite normal and part of the natural way how sutures dissolve over the 4-8 weeks after surgery.

Post-operative cataract care should be aimed at keeping your pet reasonably quiet for the first month after surgery. Remember that close objects may not be quite in focus to start with, so make allowances when out at exercise and around the house. You can expect improved sight to return from the next day to weeks post operatively as has been discussed above. Vision often seems to continue to improve for up to 2-3 months so it is worth being patient and not expecting too much too soon.

2] Exercise:

For the first week your pet should be exercised only as needed to do his business and this should be on a short lead so that you can be sure that the eye is not bumped when going through a door or gate. If the patient seems confident then the lead may be unnecessary. Playing on beach sand is not recommended. Remember that the tissues of the eye are delicate. Try to avoid sudden movements, shaking of the head or ears, and games like playing ball or “killing” a favourite toy. This would specifically be applicable if an IOL has been placed.

3] Post-operative drugs:

Treatments for your pet:

The cataract surgery has been carried out with great care under an operating microscope and sterile theatre conditions. The final successful result which we are aiming at also depends on careful post-operative nursing and conscientious medication at home.

In general most patients will require the following. There may be different medication for specific patient's situations.

a] Maxitrol/ Maxidex drops: 1 drop 4-6x/day for the first month and thereafter at a lower frequency if required. This may continue for a few months and in the rare cases for life.

b] Oral Metacam / Petcam: an oral anti-inflammatory

c] Oral Antibiotics for 5 days.

d] Cosopt / Trusopt will only be required if raised intraocular pressure is noted.

4] Postoperative re-examinations:

Part of the success of the post-operative period is for you to strictly follow the recommended re-evaluations that we require. During these evaluations we shall give your pet a full examination and perform some routine procedures like taking the pressure in the eyes and monitoring any inflammation. We recommend these examinations at the following times after surgery;

1 day: Done in clinic before discharge

7-10 days: We are looking to see that the suture line is satisfactory, the cornea is clear, and that the eye is comfortable. Usually the retina [the light sensitive part of the eye] can be seen through the ophthalmoscope at this examination for the first time since the cataract appeared. Often visual responses are present to tell us how much your pet sees. Medications may be reviewed.

Two weeks: [Optional] Usually we ask you to arrange an appointment to see your own veterinary surgeon to split the time in the first month. This allows them to assess progress of your case, and to see the results that could be applied to other similar cases in their practice.

One month: perhaps the best time for the ophthalmologist to assess the success of the operation. The treatment plan will be set for the next period.

Further check-ups are used to monitor progress if required. It has been shown in human and animal cataract patients that some "relapses" of the red eye can occur up to 6 months post op. If at any stage post operative that you think there is a problem, discomfort or change in colour of the eye please bring this to the attention of the ophthalmologist.

A reduced consultation fee is levied for all examinations following the first week's examination. These are **not included** in the initial cost of the surgery and treatments. Should it be necessary to change or extend medications beyond that given at discharge, these costs also are not included in the initial charge for surgery.

Estimated Costs:

Below is the current, **approximate** price schedule for cataract surgery for a **10kg animal**. For animals greater than 10 kg the cost will vary according to the extra anaesthetic volume used or greater dosage of dispensed drugs such as antibiotics and anti-inflammatories. Costing could also vary according to extra medications or drops that may be required for specific patients.

Unilateral [one eye] - consult, tests, cataract surgery and consumables	10,250 DHS
Bilateral [two eyes] - consult, tests, cataract surgery and consumables	14,250 DHS
Bilateral - consult, tests, cataract surgery with intraocular lenses and consumables	16,250 DHS

Many consumables are required for this type of delicate microsurgery.

[The prices for intraocular lenses will vary according to importing exchange rate values and courier fees - at present placement per lens is 2,250 DHS]

Please note a minimal deposit of 50% is required before proceeding with the surgery. This deposit must be made in cash, credit card or by EFT and not by cheque.

The balance is to be paid **in full** on discharge of your pet.

The British Veterinary Centre accepts the following methods of payment.

1. Major credit cards (VISA, MasterCard, American Express) Debit Card
2. Cash
3. Direct Transfer to bank account:

Account Name: British Veterinary Centre

Bank: National Bank of Abu Dhabi

Branch: Khalidiya

Account Number: 0155166491

IBAN: AE850350000000155166491

SWIFT: NBADAEAA

The following could be useful indicators that there may be a post operative problem and could be worthy of contacting our hospital for an evaluation:

- Very red or congested white of the eye [sclera]
- Dullness to the cornea
- Spasm and closing down of the eyelids

Some surgical cases may require other procedures or require extra consumables should the individual cases warrant it. **The charges for these are in addition to the above standard amount.** Some examples of these could include:

- Intravenous fluids in the case of geriatric patients [over 7-8yrs]
- Extra viscoelastics.
- Use of sedation [un-cooperative patients] and TPA injection into the eye.
- Extra hospitalisation or specific feeding.
- Regular blood glucose evaluations in the case of diabetic patients.
- Laboratory blood tests as requested by the owners
- Airport collection and airline fees as requested by owners
- In some cases, the pressure inside the eyes may be raised after surgery [glaucoma] and this could potentially lead to retinal damage. This increase in pressure may require additional treatment with pressure reducing drugs. [Cosopt or Lumigan] which would be an extra cost.

The pre-operative Ultrasound and Electroretinography will be conducted on all cases as these are essential tests to ascertain the health status of the retina prior to any surgery.

Please note that it may not be logistically possible that the same ophthalmologist that you saw at the time of the initial consultation, electroretinography and ultrasound examinations is the same ophthalmologist that will perform the surgery. Surgery will only be performed by either Drs Goodhead, Venter or Odayar. If you insist on a specific clinician then please indicate this at the initial consultation and ensure that it has been recorded as such at the hospital. You may have to postpone the surgery to ensure that this ophthalmologist is on cataract surgery duty. We do a lot of national and international consulting so may not be available on the specified day.

Thank you for allowing us to examine your pet and we hope that you have found this information useful. It genuinely is our intention to give you adequate information about cataract surgery in animals so that you have every opportunity to make an informed decision in electing to consider cataract surgery in your pet. We trust that you also appreciate the potential problems that can occur based on your pet's response to

inflammation and your role in the post-operative treatment. We will endeavour to perform the surgery and in hospital management to the best of our ability and look for a successful outcome.

Should you have further questions regarding this topic please feel free to contact our hospital and we will be glad to assist you.

Remember: On the day of admission to hospital, please ensure that your pet has been starved. [this means give a meal in the evening and then no further food until admission the following morning], water is allowed during the night and bring along;

- 1] Your already opened Maxitrol and Metacam / Petcam bottles [we will return these after the surgery]
- 2] Any other medications your pet is currently on which is unrelated to the eye surgery
- 3] For the **diabetic dogs** the following;
 - a] One insulin syringe you are currently using
 - b] Your dog's own bottle of insulin
 - c] At least 3 measured meals [in a Jiffy bag] of any specific diabetic diet your dog may be on.
 - d] Since you are presenting your dog starved please **do not** give any insulin on the morning of the surgery. We will measure the blood glucose on admission and give insulin accordingly.
- 4] Please note that it is essential that the owner of the patient is present to sign the hospital admission consent forms and settle the required deposit. At this time you can confirm on the consent form if it is your intention to elect for intraocular lenses for your pet. Do not send your pet with a driver or other agent unless prior arrangements have been made.

Visit our Website at:

www.animaleyehospital.co.za

[The following are other websites that have interesting information about animal cataract surgery.]

- 1] www.eyevet.ca
- 2] www.animaleyecare.net
- 3] www.animal-eye-specialists.com
- 4] Wikipedia [look under "cataract: phacoemulsification"]
- 5] www.edow.com/html/cataracts.html

Update: Nov 2013.