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Superintendent of the Government Ophthalmic Hospital Madras

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MAJOR, I.M.S.,

Superintendent of the Government Ophthalmic Hospital, Madras.

Some twelve years ago, a distinguished member of this branch told me that "anyone could take out cataract." I disagreed with him then, inasmuch as it appeared to me that it was not so much the "taking out" of the cataract that mattered, as the way it was done. The years which have passed away since then have only served to strengthen my early belief; so much so that after having extracted some six to seven thousand cataracts, I am more conscious than ever how much there is to learn.

The Selection of an Eye for Operation.

In a famous European capital, I saw a surgeon, whose name was world-renowned, take a

* A paper being read before the Madras Branch of the B. M. Association on December 20th, 1907.

cataract patient out of his O. P. room, and place him at once on the table for extraction; the excuse he gave was that the patient might not consent to the operation, if it was delayed. I hold such a procedure to be wrong on principle. No patient should be submitted to operation, till he has been kept a few days under observation, and till it has been thereby established that the adnexa of the eye are in a healthy state. Our practice in this hospital in dealing with apparently healthy eyes, is to admit the patient, and have his eyes inspected the first thing in the morning. The Assistant-Surgeon goes round early before the patients have had time to wash their faces, and carefully surveys each selected eye. If he finds that there is no secretion, he places a small green ticket on the notes-board, and it is thus easily known that the patient is ready for operation. If, on the other hand, he finds sticky discharge closing the eyes, lying in the inner canthus, or coating the lid margins, he places a red ticket on the patient's board and so relegates him to the squad "under treatment." He requires to be on his guard, for the system of red and green tickets is now widely known, and many who are anxious to get an early release from hospital by operation, will get up early, wash their faces and then lie down again with an appearance of innocence that would deceive a detective. To obviate the danger of our being caught in this way, another barrier is interposed, and every selected eye is subjected to 24 hours of an "experimental bandage" before operation; each such bandage is opened on the morning of operation, and the state of the conjunctiva and cornea is again carefully noted. If there is evidence that the shutting up of the eye has caused irritation of

the above membranes, operation is postponed for the sake of further treatment.

To bring an eye with an inflamed conjunctiva into a healthy state is not always a simple matter, and not infrequently the use of strong measures delays the desired result. Under such circumstances the use of chinosol solution, of argyrol, or of weak protargol and other such non-irritating remedies proves very valuable. On the other hand, recalcitrant cases with a large amount of purulent discharge often yield best to strong silver or to forcible friction with a 1 per cent. solution of perchloride of mercury. In all such matters judgment and experience play an important rôle.

When there is obstruction or inflammation of the lachrymal passages, extirpation of the sac is a valuable measure and one I resort to without the least hesitation. It has been performed 325 times in this hospital during the last three and a half years.

The bacteriological examination of the conjunctiva in every case is unfortunately impossible here at present owing to the large numbers we have to deal with.

The Preparation of the Patient for Operation.

Lt.-Col. Herbert, I.M.S. (retd.), has for many years advocated the antiseptic treatment of the conjunctiva before operation. At one time I gave this method a trial, but unfortunately dropped it, discouraged by a few bad results. I therefore confined myself to a careful scrubbing of the conjunctiva by means of cotton wool swabs mounted on small sticks, and carefully sterilised in the steam steriliser. Even with the greatest care I found that at

times I failed to exclude sepsis, and I was therefore induced to give Herbert's method another trial. It is as follows:—Some 10 minutes before operation the everted lids are exposed for from 1 to 2 minutes to a stream of perchloride lotion (1/3000.) To quote Herbert's own words in a letter he wrote me : " the perchloride imprisons the organisms in the mucus, whose secretion it excites; . . . all mucus and filmy exudation is removed by movement of the lids under a stream of saline fluid, and by a touch with gauze if necessary." It at once occurred to me to combine Herbert's method with my own, and this I now invariably do. An assistant applies the perchloride according to Herbert's directions; the patient comes on the table, and there I swab out the conjunctival sac to its farthest recesses with sterilised wool swabs under a stream of boiled water, poured out of a boiled irrigator. The results have been most gratifying, as may be gathered from the following facts.

The records of the hospital show that in 1897, out of 1,161 cataracts extracted there were 98 failures. The figures are taken from my predecessor's notes in the operation register of the hospital :—

Total No. of cases.	Suppuration and Panophthalmitis.	Suppurative Iritis and Keratitis not ending in Panophthalmitis.	Non-suppurative Iritis.	Unclassified failures.
1161	18 or 1·55%	15 or 1·29%	38 or 3·27%	11 or 0·94%.

The remaining 16 are attributed to causes other than sepsis.

In 1902 I published in the *Lancet* the results of 750 cataract extractions, performed in the hospital in 1901 and 1902 (June 1901 to

February 1902). The following table shows the results so far as sepsis was met with :—

Total No. of cases.	Panophthalmitis supervened in	Suppurative Iritis and Keratitis not ending in Panophthalmitis in	Non-suppurative Iritis in
750	3 or 0·4%	16 or 2·13%	15 or 2%

In 1907 I commenced to use Herbert's method in combination with my own. At first a few cases were selected for it out of each batch, but later the combined method was adopted as a routine for all cases, and is so to-day.

From October 1906 to October 1907 I extracted 725 cataracts, of which the eyes had been prepared for operation in this way. The results are as follows :—

Total No. of cases.	Panophthalmitis supervened in	Suppurative Iritis in	Subacute Iritis in
725	1 or 0·13%	1 or 0·13%	6 or 0·8%

In the case of panophthalmitis, the lachrymal sac of the same side had been submitted to operation by another surgeon. It was unfortunately assumed that the extirpation had been complete, an assumption which a careful examination subsequent to the disaster proved to have been ill-founded. Of the cases in which I have myself extirpated the sac, and subsequently removed the lens, all have done well, and it was a confidence so engendered which led me to assume all was well in this case. I cannot sufficiently regret that I was not more sceptical. Subsequent to the 725 cases we are considering, 169 more extractions have been performed here up to the present date, without another case of panophthalmitis. This makes a total of 894

Comparative Statistics of Septic Incidence and of failure of vision due to Sepsis in 1897, 1902 *and* 1907.

Year.	Total number of cases dealt with.	Number of cases of Panophthalmitis.	Number of cases of Suppurative Iritis and Keratitis.	Number of cases of Non-suppurative Iritis.	Number of cases of unclassified failure (presumably septic).	Percentage Index of septic incidence.	Number of cases of failure of vision due to sepsis (p.l. or less).	Percentage Index of loss of vision due to sepsis.
	1	2	3	4	5	6	7	8
1897	1,161	18 or 1·55%	15 or 1·29%	38 or 3·27%	11 or 0·94%	6·11 to 7·05% (according as the unclassified failures are excluded or included).	75	6·11 V=0 or p.l.
1901-02	750	3 or 0·4%	15 or 2·13%	15 or 2%	Nil.	4·53%	24	3·2%
1907	725	1 or 0·13%	1 or 0·13%	6 or 0·8%	Nil.	1·06%	2 to 3 (According as the doubtful case is included or excluded.)	0·275 to 0·4 %

(see postscript) with one case of panophthalmitis; one reflects with pity and regret that even that one was unnecessary.

The case of suppurative iritis ended in loss of vision.

The six cases of subacute iritis were of a mild type, as may be gathered from the final vision of five of them, which was respectively 5/30, 5/20, 5/20, 5/15 and 6/5. The sixth case occurred in a young man suffering from congenital cataract, and the final vision was only H. M. It seemed likely that this result was due more to antecedent fundus changes, than to the inflammatory condition. In any case it will be observed that only in 3 (0·42 per cent.) at the outside can sepsis be held accountable for loss of vision, though it may have lowered the final result attained in four others.

It will be observed that the percentage index of sepsis after extraction which stood at 7 in 1897, fell to 4·53 in 1902, and to 1·06 in 1907. If the index of sepsis destructive to vision (*i.e.*, responsible for a vision of less than 5/30) be taken for 1907, it stands at from 0·275 per cent. to 0·42 per cent. according as we count in the doubtful case above alluded to or not. I lay some stress on these figures, because the claim has been urged that the extraction of a lens in its capsule removes the element of danger from inflammation, which we must encounter if we leave the capsule behind. I hold most strongly that deep-seated inflammation of an eye after extraction is due to sepsis and that to take any other view of the case is a mere 'burying of one's head in the sand.' I would wish to be clearly understood that in so saying, I make no reflection on the operation of extraction within the capsule, towards which operation I have always

kept an open mind, and which I leave with confidence to the test of time and experience.

Sterilisation of Instruments.

For a long time past we have boiled all the instruments used. Even the knife, needle and scissors are so treated. This no doubt shortens the life of cutting instruments, but it adds greatly to the safety of the operation. Even as it is, a knife or needle will last for 20 or 30 operations, and a pair of scissors for about 100. If you will watch an inexperienced operator at work, you will observe that he frequently allows his knife or needle to rub on the margin of the lid whilst he is introducing it. He is so much taken up with his section that he has no eyes for the rest of his knife. It is obvious that this is a dangerous proceeding, and one that needs careful avoidance. My practice is to rotate the eye inwards by means of the forceps during puncture and till the moment of counter-puncture; the eye is then brought back to the mid-line for the finish of the section. In this way the lid-margin is easily avoided, more especially so, if the temporal lashes of the upper lid have been cut short the day before operation, as is always done here.

Another point often overlooked is the care of the speculum. One frequently sees an operator brush the sterilised speculum on the lid-margins whilst inserting it. If the assistant depresses the lower lid, whilst the operator raises the upper, and at the same time introduces the speculum with care, there is not the least reason to contaminate the instrument.

No instrument should be used twice without being sterilised in between. It might seem unnecessary to insist on the importance of not

allowing the operation ends of the instruments to touch the operator's hand, the pillow, the patient's face or anything else, except the eye; but I have seen these kinds of accidents happen so often that I am sure the warning is not needless. The fact is, that the surgeon has so many things to think of (until his experience is so large that he operates without conscious effort), that he may very easily forget these important details. If I may compare great things with small, it is like the tyro at golf, whose head is so full of the many things that he must and must not do that he often ends by missing the ball altogether.

On some common mistakes in Technique.

I have frequently been asked by surgeons who do a certain number of cases in the district to give them some operations in the hospital, and to advise them how best to perform them. I should like to take this opportunity of saying how much pleasure it always gives me so to do. What has struck me most forcibly is that practically every man who has not had large practice makes the same mistakes. To meet this, I venture to give a few short rules for the guidance of beginners:—

(1) Never be in a hurry; there is lots of time.

(2) Take a light hold with the conjunctival forceps, and avoid pressure on the globe. It is this forceps-pressure on the globe that leads to so much vitreous escape. The object of the forceps is simply to steady the globe.

(3) For tearing the capsule, choose a needle (Bowman's) the shank of which is at least as big as the blade. Too large a blade means too large a cut, and consequent leakage alongside the needle during laceration. Such an accident need *never* occur with a suitable needle.

(4) Enter your knife point in the needle puncture; it will slip through more easily and fill up the hole at the same time, thus avoiding aqueous leakage.

(5) Do not rotate the knife on its axis or aqueous will escape.

(6) Do not carry the counter-puncture back into the sclerotic; it adds much to the difficulty of the section. Learn to bring it out in the corneoscleral junction. This is more difficult than it sounds.

(7) On making the counter-puncture, push the blade boldly on, with a sawing movement, so as to make a large part of the section in the first cut. At the same time, turn the edge of the blade slightly forward, so that it may ride harmlessly over the iris. This turn should be made almost with the counter-puncture. It saves the iris from being scraped.

(8) Cut in the plane of the knife-blade, and not at an angle with it. If this direction is obeyed, a sharp knife cuts its way out *without effort.*

(9) Do not attempt brilliant sections. Finish your section slowly and gently. This will minimise the danger of sudden squeezes of the lids, which are likely to cause vitreous escape.

(10) To minimise the size of the artificial pupil, seize the iris at its pupillary edge with a narrow grip, and cut holding the scissors at right angles to the corneal section.

(11) Do not pinch the iris with the forceps; but seize it as gently as possible. Also avoid all drag on it. You will thus give your patient no pain; he will not shrink, and you can do your operation easily without fear of pulling the iris edges into the section, and impacting them there.

(12) Make your section big enough for easy delivery; small sections spell disaster. You should learn by the use of the needle during laceration of the capsule what kind of lens mass and to some extent what size of lens mass to expect; and you can graduate your section accordingly.

(13) Be content with the delivery of the nucleus and any cortex which readily accompanies it by manipulation. Anything left can easily be washed out. This is a safe and an easy procedure.

(14) Replace the iris thoroughly. This can be done with the irrigator stream directed under the iris, or over its surface, or placed on the lips of the wound from outside, according to the case. Failing these, use a curette; or seize each iris edge in turn with iris forceps and pull it into place. One should not rest content till a key-hole pupil is obtained.

(15) If the pupil looks very black, and the vitreous body presses against the cornea, obliterating the aqueous chamber, it is a sure sign that the hyaloid membrane is thin and that vitreous escape will ensue if the operation be pushed.

(16) Never interfere with an opaque posterior capsule left after delivery of the lens. It is more safely and better dealt with later by discission, after the section is soundly healed.

(17) Remove floating portions of the anterior capsule with iris forceps, but be ready to close the eye at once, if the vitreous threatens to present in the wound.

(18) A mass of cortical matter is often found impact below the sclerotic lip of the incision, having broken off from the nucleus in this position when the edge of the latter made its

way forward to escape by the incision. Such a mass is contained in its corresponding portion of capsule. If the latter be seized and drawn toward the pupil, the cortex is emptied into the chamber and can be easily washed out; the capsule should be removed first in the grip of the forceps.

(19) If a lens fails to present in the section, when pressure and counter-pressure are applied, the failure may be due to (1) insufficient laceration of the capsule, (2) dislocation of the lens upward beneath the sclerotic lip of the incision, (3) falling down of a morgagnian nucleus into the lower part of the chamber, (4) too small size of incision, (5) if iridectomy has not been done, to rigidity of the iris, and (6) if the suspensory ligament of the lens has ruptured, to the lens having fallen backward into the vitreous.

Insufficient laceration is met by lacerating the equator of the lens with a knife or needle, through the section.

(20) Great care should be taken to avoid a lens delivering by rotation on a horizontal lateral axis (right-to-left axis); this puts a dangerous strain on the hyaloid membrane; it is due to dislocation of the lens under the sclerotic lip; the upper part of the lens becomes fixed there and the lower can only deliver by turning upwards and forwards on the horizontal axis. This should never be allowed; the lens should be replaced in position by pressure with a curette and then delivered.

(21) A lens which is a tight fit for its section may often be delivered quite easily by rotating it when once impacted in the section on its antero-posterior axis; this can be done with a curette applied to the edge, and stroked round

it ; the action is like that of turning a cart-wheel on its axis, by seizing the tyre and turning it round.

(22) Amongst many things which I owe to Captain Kirkpatrick, I.M.S., is the knowledge of a most useful little manœuvre, as simple as it is ingenious. When the chamber empties during needling, owing to the blade of the needle being too large, or to the knife having been introduced with its edge the wrong way, or to any other cause, the chamber may be easily refilled, through the small puncture already made, by pressing the nozzle of the irrigator against the puncture, and turning on the stream. One is at once placed again in the position of working with a full chamber.

On Methods of Dressing the Eye.

There has been some discussion of recent years as to the best method of dressing the eye after operation. Whatever may be the merits of the open method (in which no bandage is used) in other countries, it has no place in a dust-laden land like India. On the other hand, I am persuaded (as the result of comparative observations recently made) that it is a mistake to use bandage-pressure on the eye as a routine measure; the tendency thereof is to cause the corneal flap to overlap the sclerotic, and thus healing in faulty position is obtained. All that the bandage should aim at *is to gently close the eye without pressure, and to exclude light and dust.* When the section tends to gape, then pressure may properly be applied. On the other hand, when the eye has long been the seat of catarrhal or other conjunctivitis, and it is expected that the discharge will be unduly free, it is most desirable not to lock up purulent secretion in the

conjunctival sac. Our practice then is to apply a shield, with a layer of absorbent wool on its outer surface. This permits the secretion to escape freely. If a case has been under active treatment for catarrh for two or three months, we wait no longer, but boldly operate with a shield; the results have justified this practice, for I cannot recollect the loss of an eye which could be attributed thereto.

I think every eye should be inspected within the first 48 hours, though after this, if all goes well, I now only open the eye once in three days.

A good deal has been written about Argyrol; it is said not to be an antiseptic. I am not prepared to argue the matter on bacteriological grounds, and I am aware that I am speaking largely on empirical grounds, but there is no doubt, whatever, in my mind that this drug is invaluable for controlling the minor conjunctival inflammations to which the eye is liable after extraction. Even in cases of suppurative keratitis and iritis I have seen the most admirable results follow the use of a 25 per cent. solution of Argyrol. Protargol is often of use, but has this drawback that patients squeeze the eye from the pain of the instillation, which is often most undesirable.

Some Points in the After-treatment of Cataract Operation Cases.

The use of sub-conjunctival injections has become very popular during the last few years. In this hospital we have given them a free trial, and have now dropped injections of sterilised air, or of chemical solutions, and confined ourselves strictly to the use of normal saline solution. The method in use has been

already demonstrated to you; if it is followed, sepsis is practically impossible, and we never see the least harm from it. Patients complain of but little pain and in the two classes of cases in which we use these injections most largely, *viz.*, for iritis, and for retained cortical masses, the results have been all we could desire. Most of the iritis cases are, of course, in other than cataract patients, but four of them were post-operative and in every one of them the influence of the injections was well marked. The iris clears, the pupil dilates and the circum-corneal zone disappears under the use of injections. As for masses of cortex, it undoubtedly hastens their disappearance, and at the same time allows the pupil to dilate under the influence of atropine. It is, of course, very difficult to correctly appraise the influence of any measure in hastening the resorption of cortex, but we have multiplied the experiment so often (having used sub-conjunctival injections 45 times during the last year for this purpose alone), that there can be, and is no doubt in any of our minds on the subject. The injections are repeated twice a week till the pupil is clear.

Dionin has been advocated as a drug which by its lymphagogue action is of service in clearing up corneal opacities, and in promoting the absorption of left cortex. For these purposes some use it quite early in the after-treatment of cataract. I have burnt my fingers more than once by making trial of methods which have been lauded on the strength of a few cases; and rightly or wrongly I fear that the use of Dionin under the circumstances mentioned above may not be free from danger. When the wound is soundly healed and the

eye looks normal ten days or more after the extraction, we have used Dionin with good results to aid in the absorption of cortex or the resorption of corneal opacities.

On a rare form of Corneal Opacity.

There is a form of corneal opacity met with after extraction, which I do not remember to have seen described anywhere. We have been watching very carefully for it of late years, and have noted its appearance and behaviour on each occasion. The leucoma is frequently ring-shaped, though the ring may be very irregular; more rarely it assumes the form of a round patch fading away at the edge; it clearly lies on the deeper surface of the cornea, or at least is most intense there; it is frequently situated in the neighbourhood of the section, though it is occasionally met with far away therefrom; rarely there may be two or even three such spots. A careful examination with a corneal loupe never fails to show the cause of the phenomenon; a fine tag of capsule is seen running up to and attached to the back of the cornea opposite the densest part of the opacity. Moreover, such opacities are commonly associated with a delay in the healing of the section. The latter point is of much interest, as it may place in our hands a ready means of bringing about closure of the chamber in obstinate cases which have defied all our efforts. If the capsule tag can be seen, it is seized with forceps and torn, when the section at once heals. Of course, there are much more common causes of unhealed section than this, *viz.*, a poor state of the patient's nutrition and interference with the eye on the part of the patient.

On Preliminary Iridectomy and on Operations for the Maturation of Cataract.

If there is one subject on which I have become more convinced than on any other, it is the *utility of iridectomy as a routine stage of extraction*. There is perhaps no operation more easy to the experienced eye surgeon, or more difficult to the tyro than the performance of a neat iridectomy. If well performed under aseptic conditions, the procedure is practically free of risk. I do not believe that in competent hands it adds very appreciably to the dangers of the operation for cataract when performed at the time, whereas when performed as a preliminary operation, experience has shown us that it may be considered practically free from risk. These considerations have led me to perform iridectomy in a large number of immature cataracts before sending them back to wait for maturity. Nor is this all. From time to time we see in this hospital a batch of cases come in, suffering from glaucoma, secondary to cataract. The swelling lens has at last pressed on the channels of outflow, and determined a rise of intra-ocular pressure. It is of interest to record that these cases often occur in batches, suggesting that some climatic influence has been instrumental in bringing about the increase of tension, presumably by playing on the vaso-motor mechanism and altering the blood-pressure. The reality of this danger may be understood from the fact that we have met with cases of glaucoma, secondary to cataract in the past year. By performing an iridectomy in all cases of immature cataract, it seems likely one would be able to lessen if not remove the danger of this complication. It is not a

matter which lends itself easily to comparative statistics, but the consideration of the figures before us bears out this supposition. In any case we rob the final operation of one stage.

When a patient presents himself with immature cataract in two eyes, we perform an iridectomy on the eye with the better sight, and a Forster's operation on the other. After trying various methods for artificial maturation of cataract, Forster's alone appears to us to be worthy of further trial. It is unfortunately a little uncertain ; sometimes it leads to maturation so rapid as to enable an extraction to take place within a month, whilst at other times, it requires several repetitions, or may even be practically a failure. So far it has not been possible to ascertain to which class of cataracts the method is most suitable, but it is hoped that this may be done in time. The advantage of being able to cut one or two years of helpless blindness is very attractive, and many of the cases have been most encouraging; but it must be squarely faced that the procedure is not without an added risk, though not a very large one. We have been carefully collecting statistics, and it is hoped to publish the result in full later.

Cyanopsia after Cataract Extraction.

Over 50 per cent. of our patients complain of cyanopsia after extraction has been performed. The complaint was only a matter of a few days. In a series of 250 only 2·8 per cent. complained of erythropsia, and 1·2 per cent. of yellow or green vision. It would appear that post-operation cyanopsia is commoner in India than in Europe. Nearly every leading text-book

lays stress on erythropsia after extraction, but I cannot find that a single one even mentions cyanopsia. The explanation offered for the blue vision is that the retina has been long exposed to yellow rays passing through a lens of that colour, and that for this reason it suffers from yellow-fatigue for a time after the predominant tint has been removed, with the result that the complementary colour is strongly before the patient's vision. There are unfortunately many points this explanation will not cover, *e.g.*, the fact that quite a large percentage of the cyanopsia patients see everything white at first and only develop the blue vision after some hours or days. Many series of observations were undertaken with a view to ascertain whether the depth of colour of the lens determined the degree or persistence of cyanopsia; even sensitive photographic paper was requisitioned to determine the relative yellow and red stopping power of the various lenses. Unfortunately it is not an easy subject for experiment, and so far our results have been negative.

The Recognition of the Physical Character of a Cataract before Extraction.

During the past four years a great deal of trouble has been taken to study the appearances of cataractous lenses before operation and to compare these observations with the physical properties of the same lenses after extraction. As a result, we have been able to define a certain number of classes of lens, and we can in many instances foretell with confidence the class of lens we are going to meet with and the special treatment it will require for its complete extraction. At the present time we are making a

systematic effort to render this classification more reliable, and more precise. It may be possible to demonstrate the various classes to the branch at no very distant date.

I am very conscious that this paper is scrappy, and that it has only touched the fringe of a large subject. My motive from the commencement was not to deal exhaustively with so immense a thesis as that of cataract extraction, on which books might easily be written, but to show, in some measure, how interesting and complicated a study is presented by this small branch of surgery, and how erroneous is the widespread belief expressed in the words with which I opened my paper, *viz.*, that "anyone can take out a cataract."

P.S.—Dated 20th Feb. 1908. One thousand consecutive cases have now been operated on for cataract after treatment by the combined method of cleaning the conjunctival sac. In this series there has been only one case of suppuration of the eyeball (alluded to in the text). 691 consecutive case of extraction have now been performed (since the one case of panophthalmitis) without a failure.