ORIGINAL ARTICLE

Structured extracapsular cataract extraction–intraocular lens microsurgical training: Report of a trainee's experience

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Abstract

Aim: The aim was to report the experience an ophthalmologist gained in a structured intraocular lens (IOL) microsurgery training program for the information and benefit of colleagues in ophthalmology training institutions.

Materials and Methods: An ophthalmologist was trained in extracapsular cataract extraction (ECCE)–IOL implant in Aravind Eye Hospital (AEH), Madurai, for a period of 8 weeks. Details of patients operated on, procedures observed, and conferences attended were prospectively recorded in a log book.

Results: Training was available in conventional ECCE with posterior chamber IOL (ECCE–PCIOL), small incision sutureless cataract surgery, and phacoemulsification. During the period, this trainee observed a total of 1527 cataract extractions, administered 528 retrobulbar and 1047 facial blocks, and also operated on 75 patients.

The trainee gained experience and confidence to perform high-quality, low-cost cataract surgery.

Conclusion: Hands-on experience and competence in quality ECCE–IOL implant microsurgery can be acquired in a short period of time in a high-volume cataract center. Trainees can also be exposed to other techniques of cataract surgery. Ophthalmology training centers with diminishing surgical training opportunities can also benefit from this structured training in a high-volume cataract center like Aravind Eye Hospital.

Key words: Experience, microsurgical cataract training

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Introduction

Cataract surgery is the most commonly performed eye operation in the world.[1]

In recent years, cataract surgery and the way it has been performed has changed considerably with a shift toward microsurgical intraocular lens (IOL) implant surgery requiring complex and expensive instrumentation. These advances in the technology have resulted in faster recovery periods and better visual outcomes.[2]

The burden of cataract blindness is a major challenge for all developing countries,[3] especially in Asia and Africa. High-quality, high-volume, low-cost cataract surgery has significant implications for developing countries because the principal solution to clearing the backlog of cataract blind cases is performing cataract operations on a large scale.[4]

Ophthalmologists, in order to give their patients the best affordable quality eye care, have to continuously update their skills.

In countries where the cataract backlog is high, ophthalmologists need to perform high-quality, low-cost, high-volume cataract surgery to clear the cataract backlog and restore sight to the cataract blind eyes. In such counties, there is a need to increase the cataract surgical rate. A study

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done in Nigeria[5] shows that trainee ophthalmologists are in favor of implementing a structured cataract surgery course in the residency program to train ophthalmologists to be competent cataract surgeons and provide quality surgery. It has been shown that a structured surgical curriculum can significantly decrease the complication rates in cataracts for trainees.[6]

In some developed countries, there is limited surgical exposure for some cadres of trainees.

There are reports of inadequate surgical exposure for trainee ophthalmologists in the United Kingdom.[7-9]

Only 42% of Senior House Officers in training met the Royal College of Ophthalmology's minimum requirement of 50 complete intraocular operations under supervision.[7]

There is a fear that this could potentially compromise ophthalmic training in the future.[8,10]

Also in the United States, decreasing surgical numbers is one of the factors currently threatening the quality of phacoemulsification training.[11]

A comprehensive survey of 129 ophthalmology training programs in the United States showed that up to 68% of residents rotated out of their main facility to perform cataract surgery.[12] Due to the graded, structured training program done in World Health Organization (WHO)-certified training centers, trainees in developed countries who routinely practice phacoemulsification will benefit from the exposure to high-volume surgery This will not only improve their skills, but also enable them meet the specified standards as regulated by their training body.

Aravind Eye Hospital (AEH) is a WHO collaborating center for the prevention of blindness, and ophthalmology training. It offers training in conventional extracapsular cataract extraction with posterior chamber IOL (ECCE–PCIOL) implant surgery, small incision sutureless cataract surgery (SICS), and phacoemulsification, and trainees are able to develop desired cataract surgical skills. Training in AEH was not just about IOL microsurgery, but also about low-cost, high-volume, high-quality cataract surgery [Figure 1].

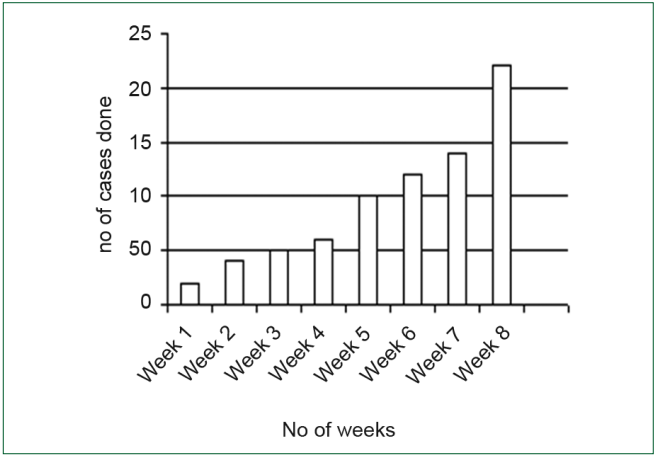

Figure 1: Number of elective ECCE–PCIOL cases handled by the trainee per week ($n = 75$)

This is a report of an ophthalmologist's ECCE–IOL implant microsurgery training experience at AEH, Madurai, India, and its implication for training ophthalmologists in developed and developing countries.

Materials and Methods

An ophthalmologist was trained in ECCE–IOL implant microsurgery in AEH, Madurai, for a period of 8 weeks. This was a structured skills transfer course in IOL microsurgery.

The training included didactic lectures, clinical observations, and hands-on practical experience.

Details of patients operated on, procedures observed, and conferences and audits attended were recorded in a log book.

The 54-hour work week consisted of

1. Didactic lectures
   These included a revision of the basic surgical anatomy of the eye, introduction to the instrumentation of ECCE–IOL implant microsurgery, preoperative patient management, different techniques in IOL microsurgery, postoperative management, and the setting up and management of cataract eye camps.
2. The daily observation of at least 30 cataract extractions either by conventional ECCE, SICS, or phacoemulsification (using the observer's eye piece on the microscope or by a closed-circuit TV) was mandatory before the hands-on surgical training for each day.
   Each trainee was assigned to and supervised by a fellow trained in ECCE–IOL implant microsurgery.

Table 1: Weekly practical surgery timetable

No. of weeks	Competency
Week 1	Stepwise hands-on introduction to all the steps of ECCE. One patient operated on per day
Weeks 2 and 3	All the steps of surgery done by the trainee under supervision. Practical corrections done by the trainee when applicable. One patient per day
Week 4	Independent surgery. Supervision if required. One case per day
Weeks 5 and 6	Independent surgery. Two cases per day. More cases given if the supervisor affirms competencies
Weeks 7 and 8	Independent surgery. Three cases per day. More cases given if the supervisor affirms competencies

The initial practical training included wet lab practice using a microscope for seven consecutive evenings, and placing at least 50 radial equidistant sutures a day. SICS/phacoemulsification trainees were required to practice tunnel construction, corneal entry, and capsulorhexis.

3. Hands-on experience included the administration of at least 10 retrobulbar and 20 facial nerve blocks (van Lint technique) per day on patients scheduled for cataract surgery and also the staggered surgical training as outlined in Table 1

Each trainee ran two operating tables simultaneously operating on one patient while the other was prepared on the other table.

Postoperative examination of patients and practical management of postoperative complications were done with the supervising fellow. An appraisal meeting was held twice weekly with the Chief of Cataract Surgery.

Trainees observed the manufacture of quality, low-cost intraocular lenses and other surgical and medical consumables at the pharmaceutical laboratory of the hospital.

In addition, the trainees were exposed to weekly grand rounds, eye camps, and an eye camp audit. The trainee also attended a regional ophthalmology conference.

Results

The trainee surgeon observed 1527 ECCE–IOL implant microsurgeries, administered 528 retrobulbar and 1047 facial blocks, and performed 75 ECCE–IOL implant microsurgeries. Table 2 shows the number of cases handled by the trainee per week.

The use of new techniques like SICS, foldable IOLs in phacoemulsification, and the use of trypan blue, iris hooks, smile, frown, and temporal incisions to correct astigmatism were also observed [Table 3].

Table 2: No. of elective ECCE–PCIOL cases handled by the trainee per week (n = 75

Week no.	No. of surgeries done
Week 1	2
Week 2	3
Week 3	5
Week 4	6
Week 5	10
Week 6	12
Week 7	14
Week 8	23
Total	75

Table 3: Procedures observed by the trainee

Procedures	No. of times observed
Small incision sutureless cataract surgery (SICS)	1446
Phacoemulsification	81
Use of trypan blue	8
Use of iris hooks	4
Use of capsular tension rings	3
Use of intravitreal triamcinolone	3

Discussion

Continuous medical education (CME) is important for medical practitioners to be proficient in and keep abreast of new technological developments.

In cataract surgery, technical advances are occurring ever more rapidly, enabling improved surgical management and visual outcomes.[2] To enhance the training of ophthalmologists around the world, it is critical to have the best possible teachers. These teachers must not only have excellent clinical skills but also must have an understanding of how to organize training programs and teach effectively.[13]

AEH is one of many WHO-approved centers with structured programs for training in ECCE–PCIOL, SICS, and phacoemulsification. There, the trainees were exposed to topical didactic lectures, wet labs, and graded hands-on training under supervision. Training in AEH was not just about IOL microsurgery, but also about low-cost, high-volume, high-quality cataract surgery.

High volume

We were trained to operate quickly, but without compromising quality, with one surgeon running two operating tables to save the time used in preparing the patient for surgery. The practical surgical training started with one supervised case per day, gradually building up to four independent cases per day. It was a gradual preparation for performing high-volume cataract surgery.

Low cost

The consumables were locally produced and judiciously shared, bringing down the cost per patient. Trainees were also shown how and where to source low-cost, high-quality consumables.

High quality

There was continuous monitoring during surgery and postoperative supervision by experienced IOL fellows.

This trainee was also exposed to high-volume eye camps and an eye camp audit.

Ophthalmic surgeons from developing countries can be

trained in this manner to clear their cataract backlog.

Also, ophthalmologists from developed countries with diminishing surgical exposure may benefit from the structured high-volume phacoemulsification training.

Conclusion

In conclusion, experience in high-quality, low-cost, high-volume IOL microsurgery can be acquired in a short period of time. Trainees can also be exposed to other techniques of cataract surgery. Different trainees could develop cataract surgical skills using the appropriate technology for their environment.

There are many advantages of a structured microsurgery IOL training program.

Ophthalmologists – both trainers and trainees – benefit from improving their cataract skills. This could ultimately translate to patients benefitting from improved surgical outcomes, and also, communities will benefit when these skills are used to clear the cataract backlog.

It is hoped that the findings from this report will be useful to develop strategies to enhance the training of cataract surgeons in developing and developed countries.

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