HAND BOOK FOR

CLINICAL OPHTHALMIC ASSISTANTS

PRINCIPLES & TECHNIQUES OF CLINICAL OPHTHALMIC PROCEDURES

OATS

Ophthalmic Assistant Training Series

ARAVIND EYE CARE SYSTEM

The Training in Ophthalmic Assisting Series and Training in Eye Care Support Services Series were born from the vision and inspiration of one very special man, Dr. G. Venkataswamy, founder of Aravind Eye Hospitals and guiding light in the world of eye care and community ophthalmology.

We dedicate this effort to him.

Intelligence and capability are not enough. There must also be the joy of doing something beautiful. Being of service to God and humanity means going well beyond the sophistication of the best technology, to the humble demonstration of courtesy and compassion to each patient.

- Dr. G. Venkataswamy

Ophthalmic Assistant Training Series (OATS)

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Foreword

The discipline of eye care requires a number of appropriately trained personnel working as a team to deliver comprehensive eye care. The services that are delivered must include the promotion of eye health, the preservation of sight and the prevention of vision loss, restoration of sight when it is lost, the enhancement of vision and functional vision, where feasible and facilitation of rehabilitation through vision substitution. Various cadres of trained personnel, with complementary skills contribute to the work of the team.

In an ideal world, with infinite resources there would be a temptation to use the most highly trained personnel to carry out these tasks. This is neither appropriate nor cost effective, given that human resources for health care comprise the most expensive component of the recurring health budget.

It has been possible to select, train and deploy different cadres of human resources, to carry out tasks in a safe and effective manner to help achieve the goal of eliminating avoidable blindness. One of such cadres is variously referred to as Ophthalmic Assistants, mid level personnel or by their primary functions, such as Nurses, Refractionists etc. Where they exist and function in a stipulated manner, it is acknowledged that they constitute an effective backbone for eye care services. However a critical element to their success lies in the adequacy and appropriateness of the training imparted to them.

There have been several training programmes put in place around the world to train such mid-level personnel depending on the one hand, on the human resource needs for eye care in the country, and the local human resource policies, rules and regulations, on the other.

The Aravind Eye Care System, over the years has developed a cadre of Ophthalmic Assistants who have specific job descriptions. To enable them to perform effectively as part of the eye care team, their training has been task oriented with defined requisite knowledge, skills, competencies and attitudes, to carry out the tasks.

This manual sets out in several sections a step by step method for imparting such task oriented training through didactic, hands on and practical training in real life situations. The sections relate to tasks required of such personnel in different settings in the eye care delivery system such as the out-patient department (general and specialist clinics), wards, operating rooms, optical departments etc. Considerable emphasis has been paid to diagnostic technology, which is increasingly a part of the armamentarium in eye care practice.

Finally the manuals include sections for self assessment as well as for continuing monitoring of the achievements of task oriented objectives. The manual lends itself to translation into local languages where required proficiency in English may not exist. The Human resource Development team at Aravind Eye Care System need to be complimented on their efforts to share there wide and successful experience in this field with others who are already involved in or are planning to venture into such training programmes, particularly in the context of VISION 2020: the Right to Sight.

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Past President, IAPB, Co Chair,
Human Resource Programme Committee, IAPB.

Preface

In recent years there have been significant advances in eye care, both in technology and in the increasing resolution to address the scourge of needless blindness. Achievements in medical technology have vastly improved diagnosis, treatment and surgery in all aspects of eye care, and efforts like the global initiative "VISION 2020: The Right to Sight" -- which calls for the elimination of avoidable blindness by the year 2020 -- have galvanized support for those working to improve the quality of eye care at the grassroots level around the world.

It has become increasingly evident that trained personnel is one of the most important elements in achieving this goal, and that the effective practice of eye care is a team effort that must combine the talents of ophthalmologists, ophthalmic assistants, ophthalmic technicians, orthoptists, counsellors, medical record technicians, maintenance technicians, and others.

Currently the focus in human resource development continues to be on the training of ophthalmologists. But in many successful eye hospitals it has been shown that four or five trained ophthalmic assistants are engaged to supplement and support the work of an ophthalmologist. When such assistants are used effectively by eye care centres, doctors can treat more patients in less time while still ensuring a high standard of care. It is therefore vital that more attention be paid to the structured training of other ophthalmic personnel.

Over the past three decades, Aravind Eye Hospital has developed and refined a system of structured training programmes for ophthalmic assistants and support services personnel. These series were created to bring together the lessons we have learned over the years, and to share our insights with other eye care programmes and the community at large.

Dr. G. Natchiar
Vice-Chairman, Aravind Eye Care System

Blindness Prevalence

World wide it is estimated that at least 38 million people are blind and that an additional 110 million have severely impaired vision. In all, about 150 million people are visually disabled in the world today, and the number is steadily increasing because of population growth and aging. Overall, the data shows that more than 90% of all blind people live in developing countries and that more than two-thirds of all blindness is avoidable (either preventable or curable). Unfortunately, little information is available on the incidence of blindness around the world; it seems probable, however, that there are some 7 million new cases of blindness each year and that despite every intervention, blindness in the world is still increasing by 1 to 2 million cases a year. Thus, trend assessment points to a doubling of world blindness by the year 2020 unless more aggressive intervention is undertaken.

A major cause of preventable blindness is cataract. Presently, an estimated 7 million cataracts are operated on each year. There is a backlog of 16 million cases that have not yet been operated on. If this backlog is to be eliminated in the next two decades…a staggering 32 million cataract operations must be performed annually by the year 2020.

In addition, there must be an improvement in technology because more than 50% of cataract surgeries in the least developed countries today are still performed without intraocular lens implantation. Thus, most of the developing countries need more surgery facilities, supplies and equipment, and an increased number of trained surgeons. Furthermore, particularly in sub-Saharan Africa, India, China and other parts of Asia, the volume of cataract surgeries must increase greatly. Although considerable progress is being made in some of these countries, the provision of good quality, affordable cataract surgery to all those in need will nevertheless remain the main challenge for ophthalmology world wide for many years to come.

An important aspect of combating cataract blindness is human resource development. To increase the efficiency of ophthalmologists in clinical work, further training of support staff such as paramedical ophthalmic assistants, ophthalmic nurses and refractionists is essential.

Introduction

In the past three decades, a number of auxiliary professionals such as ophthalmic assistants, opticians, certified orthoptists, research assistants and ultrasonographers have come to be identified as allied health personnel in ophthalmology. Although each of these groups provides a specific meaningful role in the ophthalmic field, it is the ophthalmic assistant (OA) who carries out or helps with certain tasks that were traditionally and uniformly performed by the ophthalmologist.

These tasks involve collecting data and recording measurements on patients, preparing patients for surgery, assisting with surgery, offering postoperative care, and counseling patients. However, these tasks do not involve any judgments or conclusions such as diagnosis, disposition of treatment, or prescription. Ophthalmic assistants do not (and can not) supplant the physician but rather supplement the ophthalmologist by rendering support services. Their broad areas of work include outpatient and refraction departments, operation theatre, wards, and patient counseling.

The ophthalmic assistants in all these areas make vital contributions to the achievement of high quality, high volume, and financially sustaining eye care in large volume settings.

Ophthalmic Assistant Training

Objective

To provide eye care programmes/hospitals/practitioners in developing areas with lessons learned regarding the work of trained ophthalmic assistants and their critical contributions to high quality, large volume, sustainable eye care.

To describe the valuable role of trained OAs and patient counselors in outpatient and refraction departments, operating theatres, wards and patient counseling. To illustrate ways for existing programmes to increase their volume, quality and sustainability through the development and utilization of paramedical personnel.

To provide curriculum and materials for training the OAs in all areas. To elicit feedback from users regarding the strengths and weaknesses of this first edition.

Definitions

The ophthalmic assistant (OA) is a skilled person whose academic and clinical training qualifies to carry out ophthalmic procedures. These are done under the direction or supervision of an ophthalmologist or a physician licensed to practice medicine and surgery and qualified in ophthalmology.

At Aravind, based on their skills and performance, an ophthalmic assistant with at least five years of experience is upgraded to an ophthalmic technician. At Aravind the term nurse usually refers to registered nurse (RN) fully trained elsewhere in all aspects of nursing care. However, the term is some times used at Aravind in traditional operating theatre terminology, as in scrub nurse, running nurse, etc.

Ophthalmic assistant training

Recognizing the importance of ophthalmic assistants in eye care service delivery, Aravind established its in-house training program to meet its own need for trained Ophthalmic Assistant staff. Yearly two batches of 17 to 19 year old candidates (35-40 students in each batch) who have cleared their high school examinations (plus two) are selected based on the eligibility criteria deemed appropriate by the institution.

Structure of the OA training programme at Aravind

Basic training: Four months observation and classroom learning

Specialisation: Eight months demonstration training and practice

Probationary Period: One year on the job training under constant supervision

The basic training portion includes studies and practice in

- Basic general anatomy and physiology
- Ocular anatomy, eye diseases and emergency management
- Skills such as
  - Visual acuity testing
  - Tonometry
  - Lacrimal duct patency
  - Blood pressure management
  - Bed making
  - Human relations, communication skills and compassion

On completing the four-month basic training, students take one of the specialization courses:

- Out-patient care (OPD)
- Operation theatre assistance
- In-patient care (Wards)
- Refraction

The next eight months are spent training in the specialty with lectures in the morning and supervised practical work in the afternoon. For the final 12 months, candidates work under close supervision.

The Aravind model of Ophthalmic Assistant staffing

The role of trained Ophthalmic Assistant staff in facilitating high quality, large volume sustainable eye care is central to Aravind's successful large volume eye services. The principle of division of labor helps to maximize the skills of the ophthalmologist by developing a team approach with auxiliary personnel. Efficient eye care service delivery depends on optimum utilization of all categories of resources – human resources, equipment, instruments, beds and financial.

At Aravind, the concept of human resource development evolved in response to increasing need for OAs and to provide adequate clinical experience to develop their professional competence.

Human resource development is one of the important components of large volume eye care. The history of Aravind's Ophthalmic Assistant training can be traced back to 1970-1972 when its founder, Dr. G. Venkataswamy , was Professor and Head, Department of Ophthalmology, Madurai Medical College.

Trained and skilled human resources are critical and therefore must be utilized optimally. Typically, an ophthalmologist's repertoire of work involves administrative tasks, skilled but repetitive tasks, and judgement-based tasks. An ophthalmologist's unique competence lies in judgement-based tasks such as interpreting investigative findings and decision-making tasks such as delineating the line of treatment or surgery.

Administrative and repetitive tasks can often be done (and better also) by a non-ophthalmologist who has been adequately trained.

In large volume eye care programs, efficient and knowledgeable Ophthalmic Assistants play a vital supportive role in many areas of ophthalmic care.

About the Ophthalmic Assistant Training Series (OATS)

The Ophthalmic Assistant Training Series responds to the desire of many organisations and institutions around the world to provide high quality and high volume eye care.

The contribution of the ophthalmic assistants to this work is fundamental.

The Ophthalmic Assistant Training Series is a set of manuals explaining the principles and techniques for increasing high quality and high volume eye care through the use of paramedical staff.

Each module is based on the practices of Aravind Eye Hospitals in South India.

The intent of this series is to provide a format for Ophthalmic Assistant Training based on Aravind Eye Hospitals' "best practices", based on over 30 years of growing, changing, and learning from mistakes.

The five modules of OATS

1. **Introduction to Basics of Ophthalmic Assisting** : This is the foundation of the entire Ophthalmic Assistant Training. All the trainees are given general knowledge and training for the fundamentals necessary for their duties, as well as specific information about all activities required in their work.

2. **Handbook for Clinical Ophthalmic Assistants, Principles & Techniques of Clinical Ophthalmic Procedures:** Out-patient Department (OPD): This includes theory and practice of initial patient evaluations. An introduction to refraction is presented as well as steps for assisting the doctor.

   Ward: This contains all the information necessary for the smooth running of a Ward. Pre and post operative procedures and patient instructions, as well as management of emergency and post operative complications are discussed. Ward set-up and management and laboratory functions are covered.

3. **Handbook for Surgical Ophthalmic Assistants (Operation Room Services)**: Contains background and practical steps to the smooth running of a sterile theatre. Personnel requirements, roles and duties of theatre personnel including management of emergencies and medications, and assisting in specific procedures are detailed.

4. **A text book on Optics and Refraction:** All aspects of refractions are covered, including step- by step instruction for subjective and objective refraction, room set up, and equipment required. All types of refractive errors are described as well as the methods of assessing them. The theories and practice of visual fields, ultrasonography, contact lens fitting, low vision aids and optical dispensing are included.

5. **Role of Counselling in Eye Care Services - A practical guide :** Helping patients help themselves. The importance and types of patient interaction are discussed in detail. Basics of communication and specific examples are presented.

About Training in Eye Care Support Services Series (TECSSS)

The Training in Eye Care Support Services Series (TECSSS) responds to the desire of many organisations and institutions around the world to train support services personnel to provide high quality and high volume eye care.

The Training in Eye Care Support Series is a set of manuals explaining the principles and techniques for the effective procedures to be followed by the support services personnel.

Each module is based on the practices of Aravind Eye Hospitals in South India.

The intent of this series is to provide a format for Training in Eye Care Support Services based on Aravind Eye Hospital's "best practices", based on over 30 years of growing, changing, and learning from mistakes.

The three modules of TECSSS

1. **Housekeeping in Eye Care Services - A practical guide :** The invisible "bottomline" for patient safety and satisfaction. Cleanliness, appearance, maintenance, attitude are all essential for the entire hospital and OPD. Duties, responsiblities and specific tasks are covered.

2. **Medical Records Management in Eye Care Services - A practical guide** : A complete guide to establishing and running an efficient medical records department: information retrieval, generating statistics, personnel requirements, importance of accuracy.

3. **Optical Sales and Dispensing - A practical guide :** This gives clear guidance about the various spectacle lenses and frames, how to fit the lens into frame, the technical measurement and sales procedure.

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Ophthalmic Assistant Training Series

Acknowledgements

We take great pleasure in presenting the Handbook for Clinical Ophthalmic Assistants (Priniciples & Techniques of Clinical Ophthalmic Procedures) which is the consummation of many years of experience and tireless efforts by Aravind's ophthalmic assistant training department.

We acknowledge Seva Foundation's help through a series of volunteers who coached our team, helped in designing the structure, edited the contents, ensured academic rigor and making it relevant for transfer to a larger global audience, under the initiative of Dr.Suzanne Gilbert. In addition Seva Foundation is covering a part of the production costs. Sight Savers provided the initial stimulus and support for understanding the role of ophthalmic assistants in a broader context and in the development of a draft curriculum. We express our gratitude to Mr. David Hirschman for editing the manual.

We express our sincere thanks to Dr.Pararajasegaram for contributing foreword to the series.

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Finally we sincerely thank the senior leadership team of Aravind Eye Care System particularly our Vice - Chairman Dr. Natchiar for the constant support and encouragement.

The Ophthalmic Assistants team

Aravind Eye Care System

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CHAPTER 1 ORIENTATION TO OUT-PATIENT SERVICES

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Communication with patients
Relationship with other departments
Department structure and function

GOALS

To enhance the ophthalmic assistant's (OA) knowledge of the Out-patient department and to show how to provide compassionate and quality service to all patients.

OBJECTIVES

The OA will be able to

- Welcome the patient with a smile
- Direct the patient to registration and speciality departments
- Answer questions patiently and clear doubts
- Maintain interdepartmental relationships
- Use and maintain supplies
- Maintain instruments and equipment
- Understand the department's organisation to enhance its flow

CHAPTER 1

Orientation to Out-Patient Services

The out-patient department (OPD) is the threshold for patient consultancy and service. It is the connecting link between the community and the hospital. The patient is a stranger to the environment; therefore they must receive proper direction for their treatment to be successful. Cleanliness in the out-patient department is essential to avoid the spread of infections. Moreover, a clean environment will present a good impression and build confidence in the quality of services at the hospital.

The out-patient department is a network of all the departments in the hospital. In tertiary eye hospitals the speciality clinics include a cataract clinic, a cornea clinic, a retina clinic, a paediatric clinic, a glaucoma clinic, an orbit and oculoplasty clinic, a uvea clinic, a neuro clinic, and a low-vision-and-rehabilitation clinic.

Since refraction has to be performed on all the patients, exclusive refraction cubicles should be included in all the clinics in addition to the general refraction areas. It is helpful if the hospital provides accurate and quick optical dispensing services so the patient leaves the hospital with satisfaction.

Patient reception

When a patient enters the hospital, a warm reception from the OA directly or indirectly conveys to the patient that he/she is important. The out-patient department work plan must have a holistic approach to patient care. This holistic approach includes greeting the patient with a smile, patiently replying to repeated enquiries of the patient, maintaining registrations, directing the patient to the appropriate departments, fixing appointments without confusion, admission and discharge procedures, assisting the patient to avail reimbursement facilities and directing the patient to optical dispensing units.

To execute these vital tasks, the hospital's management should train the OAs to approach the patient with a positive attitude, and to provide compassionate patient care. Efficient and caring out-patient service provides a favourable public image (Fig. 1.1).

Fig. 1.1 - At the reception

A. Hospital entrance

The hospital is a strange place for patients. They may be frightened and need reassurance and guidance. An enquiry counter, near the entrance to the out-patient department is necessary so that the patient can obtain information about the location of various clinics and registration procedures. This should be prominently located at the entrance of the hospital and in close proximity to the admission, discharge and emergency services of the hospital. To isolate it from the noise of the busy departments, the enquiry counter can be enclosed in see-through cubicles with glass-paneled walls. This arrangement enables those at the enquiry counter to monitor the surrounding activity as well as be easily located by the patient. In the out-patient department of smaller hospitals, an open booth or counter will be sufficient (Fig.1.2).

Fig. 1.2 - The enquiry counter

B. Enquiry counter

During working hours, the enquiry counter in the out-patient department should be visibly designated and staffed with a competent and experienced person. A senior medical records staff or front-office manager is equally suitable for this job, provided the person has knowledge of the location of all facilities and activities of the out-patient and in-patient departments.

With the tremendous amount of activity taking place, tempers can easily be lost. Therefore the person at the enquiry counter should be well mannered and cool tempered, with infinite patience to listen to and answer the patient's many queries.

The entrance lobby should have public facilities, including a tea and snack bar, drinking water facilities and toilet facilities. The waiting area or entrance lobby should display information boards for the patients and public regarding names of doctors and nursing staff on duty during a clinic session.

For patients who cannot walk, adequate stretcher-trolleys or wheelchairs are required to carry them through the hospital. A place to park them should be provided at the very entrance to the out-patient department / Enquiry. The issue and replenishment of trolleys and wheelchairs can be organized under the overall control of the out-patient department coordinator.

The enquiry area should have all the information pertaining to the hospital and public services. This includes information regarding facilities, costs, names of the doctors and surgeons, and duration of hospital stay for all available treatments and problems. The medical records staff / Enquiry staff / should also be knowledgeable regarding all speciality clinic details available in the hospital. When the patient turnover is high, the hospital should be equipped with a computer system with information pertaining to out-patients and inpatients, thereby reducing the workload of the staff.

It is important that the medical record staff be informed about all meetings, seminars, and conferences that are conducted in the hospital. This will enable her to give a quick response about the availability of the doctors to the patients.

Since patients are likely to visit the hospital from different places, states, and countries, a travel desk is helpful for patients to reserve tickets and arrange travel and tours well in advance. It is advisable to have a list of air, bus, and train timings at the counter. The medical records staff can guide the patient to the travel desk. Having a map of the city may be helpful in assisting patients in visiting their places of interest.

C. Medical records

Maintaining the patients' case records is important to document the type of treatment given previously and for review. The medical records system must be well planned for the easy retrieval of case sheets (Fig 1.3). New patients must be managed in a separate queue and particulars like name, age, sex, address for communication, history of illness, and history of present illness must be made in their case record.

The Proper maintenance of medical records is very important because much time can be wasted looking for poorly stored records

The records must be maintained manually, and, if possible, on the computer as well. The OA must learn and abide by the system planned out by the organisation, ensuring that all addenda are attached to the main file of the patient so that continuity of treatment is well documented. The medical records are to be arranged neatly in an order so that it could be traced easily.

Fig. 1.3 - Retrieval of case sheets

Instruments, equipment and supplies

Supplies are expendable items or those articles which are used and must be replaced such as soaps, towels, stationery, sterile goods.

Equipment includes more permanent articles and may be classified as fixed or movable. Fixed equipment is not a part of the structure of the building but is attached to its walls or floors such as sterilisers and sinks. Movable equipment includes furniture, instruments, syringes etc. These are items which have to be replaced frequently.

Supplies and equipment are highly important factors in a smooth running unit. Maintenance and availability reflect directly on the quality of patient care.

If the supply of materials is inadequate, the care of the patient may be jeopardized. For instance, if there is not enough cotton and gauze, the preparation of materials used in dressing will be affected. Lack of proper materials will adversely affect the comfort of the patients and delay in treatment.

Equipment which is not maintained well or is not ready for use is often more troublesome than if it were not available. The ophthalmologist, the OA, and the patient may be ready for treatment, but if the slit lamp does not function correctly then the procedure will have to be delayed or aborted. Such situations are not just embarrassing they are an annoying waste of time to all concerned.

It is often necessary to lock up excess supplies to prevent loss or wastage. There should always be enough supplies available for use and a key to the locked cupboard should be accessible at all times to the OA in charge. A system should be developed to ensure that the supervisor does not forget to leave the key when they leave for lunch, for a conference, or for a day off. Time is wasted hunting for the individual who carries the key.

For convenience and prompt service, all necessary equipment and supplies for a particular treatment should be kept in one unit even though it may mean duplication of materials. For example, the emergency medicines and oxygen though available in the intensive care unit may be kept in the out-patient department and Wards also.

Thus, the OA must make sure there is an adequate supply of materials on hand and in good condition available for use; delegate the responsibility of handling supplies and equipment; be careful about wastage and misuse; educate colleagues and other personnel in the economical use of materials; keep shelves stocked and locked; and keep the treatment room in order.

Keeping an adequate supply of materials on hand

Standards are established to maintain quantities of materials required to meet the needs of each unit. For example if an out-patient department admits 100 patients everyday on average, the OA should have 110 needles autoclaved for checking lacrimal patency. If one or two are unsterile or do not function properly, the extra needles can be used. The number of needles should not exceed 110, as it is the standard for the out-patient load, unless the number of patients is constantly on the increase.

These standards are determined by the type of service, the cost and durability of the items, and the period of time between order and delivery. Additional factors include the patients' age, sex, and the type and degree of their illness.

Many hospitals maintain an exchange system for equipment to prevent overstocking or the lowering of equipment standards. In this system, a broken item is returned to storage before a new article is issued. This allows the administration to determine the amount of breakage that happens due to inferior quality items as well as due to careless handling.

An equipment inventory is a detailed list of articles in the out-patient department, their specification, and standard number or quantity. The specifications make it possible to identify the articles by size, number or description. The standard is the number of that particular item.

Taking inventory helps to determine whether standards are maintained. It allows the hospital to replace equipment immediately if it is lost or broken, and can act as a reminder to return an item borrowed from another unit. Taking an inventory also shows excess materials which are no longer in use so that we can dispose them off.

The frequency of such inventory depends on the type of equipment. For example the ophthalmoscope, torch, gonio lens, sphygmomanometer, and the tonometer may require daily counts. These items can disappear easily. Other items such as the slit lamp and furniture may be counted weekly or monthly. For some items a yearly inventory may be sufficient. However, regular inventory helps in tracing the articles. To make this happen, each individual can be assigned a certain group of items and will take responsibility for maintaining the same.

A requisition is a written order for supplies and equipment, or a request for their repair. One person should be responsible to put such a list together weekly or daily. The requisition should take into account the perishability of the items; storage facilities available; and the cost and convenience of the handling and transportation of the orders. A requisition form must be written clearly, with the exact number and description of the items needed; it should also include the OA's name and signature, as well as that of people in authority.

Some instruments required in the out-patient department include:

- Torch light
- Direct ophthalmoscope
- Indirect ophthalmoscope
- Gonio lens
- 90 D
- 20D
- Applanation tonometer
- Schiotz tonometer
- Slit lamp

Communication with patients

Effective communication is essential in all fields. In hospitals, communication with the patient plays a vital role. As they enter the portals of the hospital with a problem, patients are in a confused state of mind with hundreds of questions in their minds. The OA should be able to understand the mental state of the patient and clarify their doubts. Sometimes the patient may ask the same question several times and the OA should answer patiently. As the patient enters the department, greet them with a smile and enter the name in the register. Guide them to the appropriate cubicle or section for the doctor to examine them along with the case sheet. As per the doctor's instruction, take them for further tests. The doctor would have informed them about their eye problem and about further tests, yet the patient may still have questions. The OA should patiently explain the doctor's instruction without showing any irritation in their tone or facial expression. Clearly explain to the patient the procedure they are to undergo before actually performing the procedure.

Communication both verbal and non-verbal plays an important part in the out-patient department. The patient will also feel comfortable in their presence. The OA must be well versed with all the procedures. Since the OAs have been handling the instruments and equipment daily, they will not have fear either in handling them or in using them on the patients.

The patient however may be afraid even to see them. So, the OA must have empathy, communicate with the patient effectively and encourage them to give their full co-operation.

The following examples illustrate the above mentioned point:

Instillation of eye drops: Inform the patient that drops will be administered to enlarge (dilate) the pupil for proper diagnosis, that the drops will have a burning sensation for a few seconds, and that there is nothing to fear. The patient will have blurred vision afterwards, so enquire about their mode of transport. If a patient came by vehicle alone, he may find it difficult to drive on his return. In some cases, the blurred vision may continue the next day and the patient may have an exam or an interview or some other important function and the blurred vision may cause inconvenience. If the OA clearly communicates the entire details, patients can plan their activities and accept the treatment.

Measuring intraocular pressure using a Shiotz tonometer. First, tell the patient why the test is being done and explain its significance. Tell the patient that drops will be applied in their eyes, and that they may cause a burning sensation, and that after one minute an instrument will touch their eye and it will not cause any pain. Step by step, give the patient instructions in their language and verify whether the patient has understood the instructions. Never assume that the patient knows about the procedure.

Telephone manners

The OA must be polite in responding to telephone calls. Though they may not be seen by the person at the other end of the line, their attitude can be sensed over the telephone and they must be clear in communicating relevant information to the patient. OA's method of handling calls must reassure the caller, and instill confidence in the hospital's service.

A good OA is / should be able to differentiate between important and casual calls. They must understand the urgency of the patient's condition and avoid unnecessary talk and comments. They must be sure about their replies, especially in granting appointments. The OA is expected to assist the doctor at any time, therefore, it is always thoughtful to maintain a separate message book to record all the messages received through phone or directly. OAs must also be very careful not to create unnecessary interruptions for the doctor.

Handling mail

Patients from far-off places may contact the OA to fix an appointment with the doctor for a check-up or surgery through post or email. The OA should bring those communications to the attention of the ophthalmologist. They must remind the doctor and ensure that a reply is sent to the patient.

Marking a review appointment

The OA is responsible for ensuring that the patient has undergone the complete treatment. If a follow-up check is recommended for the patient, fix an appointment for the patient after speaking to the doctor. The date given for each review patient must be noted in a separate book with date, time, and the name of the patient. The OA should remind the doctor about the list of appointments given to the patients every day. The OA must be very tactful in handling the patient if the doctor is late or called away for an emergency. In case the ophthalmologist happens to be out of station, the OA should immediately convey the message to the patients so that the patients can plan their visit for some other day or be seen by another doctor.

Relationship with other departments

The out-patient department should maintain cordial relationships with all the departments in the hospital to ensure smooth functioning.

For instance, the Out-patient department staff has to develop cordial relationship with the staff of the department of housekeeping and give instructions to clean the area depending on the volume of patients. When their work is not satisfactory, instead of shouting at them in the presence of the patients, have a one to one talk and make them realise the importance of maintaining cleanliness in the area.

The out-patient department and inpatient department work hand-in-hand because the patients in the ward occupy rooms as per the directions given by the ophthalmologist in the out-patient department. The OA in the out-patient department is responsible for handing over a record of all the procedures done in the out-patient department to the ward OA.

In larger hospitals there will be many departments that will be directly or indirectly connected to each other. Excellent patient care can be achieved by establishing a cordial relationship between the departments.

Department structure and functions

Chief medical officer (CMO): The chief medical officer is the chief of all the medical personnel. The doctors discharge their duties based on CMO's directions, and CMO passes suggestions and recommendations to the hospital's Board of Directors on behalf of the medical personnel. The nursing superintendent/head nurse will report to CMO about the patient and paramedical personnel and take advice in terms of manpower planning and patient satisfaction.

Medical officer: medical officers are the senior officers reporting to the chief medical officer. The medical officers are the doctors in charge of each of the speciality clinics. All the patients are discharged only after obtaining the final opinion from the medical officer. The OA of each speciality clinic take the instructions from these medical officers before instructing patients, fixing appointments, and in availing leave from regular duty.

Junior doctor: The junior doctors are those who work as post graduate students after completion of the MBBS degree. They work under the direction of the medical officer. The junior doctors handle basic science sessions for the OAs, check preliminary tests for the patient and assist the chief medical officer in surgeries. They are trained to become surgeons during their training period.

Nursing superintendent: The head OA (also called the nursing superintendent) is in charge of the entire paramedical personnel. They will be a role model for the entire paramedical department. They play a vital role in ensuring the smooth flow of the patients in the departments, the OA day-to-day activities, planning manpower, scheduling paramedical tasks, imparting training for the junior staff, and conducting continuing medical education programs for the senior staff. The nursing superintendent plans for the improvement of the OA department on the advice of the chief medical officers and medical officers.

Unit coordinators: Unit coordinators are responsible for the smooth functioning of their department. They are liaison officers between the patient, the department and the other departments. In the absence of staff, they are responsible for keeping the nursing superintendent informed, delegating duties to other OAs and ensuring that the work is completed. They supervise the junior nurses and guide them. They work with their department medical officer and the paramedics of their department to deliver the best service to the patient and towards the development of their unit.

Senior OA: Senior OAs know the rules and regulations of the organisation and will first of all be a role model for the juniors. They work under the instruction of the nursing superintendent. They handle classes for the junior OAs and demonstrate clinical functions in the training sessions. They also help the nursing superintendent in scheduling the tasks, and planning the appropriate manpower each month and year.

Junior OA: Junior OAs are trained by the senior OAs. The juniors must obey the senior OAs and respect them. They have to abide by the rules and regulations of the hospital and try to acquire the knowledge and skills required to become an efficient OA.

The OAs in the out-patient department should be efficient in fixing appointments for the patients and sorting the cases for the doctor. They should support the doctors by reminding them about the appointments for the day. OAs helps the doctors in scheduling and in the arrangement of smooth patient flow in the clinic or hospital.

Summary

In this unit the OA is given an orientation about the out-patient department. The OA plays a vital role in the patient care and patient satisfaction. Greeting the patient with a smile and communicating with them effectively creates a confidence in the patients. The OA is responsible for the adequate supply of necessary equipment and other materials in the department. OA has to check the availability of things and plan for the next day. Maintaining cordial relationships with all the departments is important for the smooth functioning of their department. To conclude it can be said the she has to be well versed not only with the clinical procedures but also in communication and maintenance of equipment and supplies.

Key points to remember

- *Delegation of responsibility in handling supplies and equipment*
- *Keeping shelves stocked*
- *Keeping the treatment room in order*
- *Taking inventory*
- *Creating systems for routine procedures*
- *Reporting deficiencies*
- *Observation of waste and misuse*
- *Education of personnel on economic use of hospital property*
- *Handling all the instruments with care*
- *Taking faulty instruments to the service station*
- *Maintaining sterility of instruments*
- *Maintaining cordial relationship with all the departments*

Student exercise

Answer the following

1. *Write short notes on*
   a. *The enquiry counter*
   b. *Medical records*
   c. *Maintenance of equipments and supplies*
2. *List the responsibilities of OA in maintaining adequate supplies.*
3. *What is meant by exchange system?*
4. *What are the different types of instruments required in the out-patient department?*
5. *How should telephone calls be handled?*

CHAPTER 2 FUNDAMENTALS OF OUT-PATIENT SERVICES

CONTENTS

History taking
External examination of eye
Visual acuity
Measuring intraocular pressure
Evaluation of the patency of lacrimal drainage apparatus

GOALS

To equip the ophthalmic assistant (OA) with the skills to gather the history of the patient, examine the external condition of the eye, perform vision testing, interpret the results in the case sheets, carry out lacrimal syringing, and measure the ocular pressure by adopting the correct medical procedures.

OBJECTIVES

The OA will be able to

- Explain the purpose of history taking and developing a good rapport with patients
- Taking a case history by following the standard method and collecting demographic data, past history, family history and medical history
- Illustrate the use of a vision / visual acuity test
- Categorise different types of visual testing charts according to their uses
- Understand how to perform vision tests
- Evaluate the patient's vision and visual acuity measurements
- Understand the advantages and disadvantages of each vision chart
- Define intraocular pressure and explain the methods of measuring IOP
- Describe the working and usage of a Schiotz tonometer
- Explain how to maintain and sterilise a Schiotz tonometer
- List the advantages and disadvantages of a Schiotz tonometer
- Interpret the Friednwalds chart correctly and record the results
- Explain the basic anatomy and physiology of the lacrimal drainage system
- Perform various tests used to evaluate the patency of the lacrimal passages
- Interpret the results of syringing

CHAPTER 2

Fundamentals of Out-Patient Services

History taking

In any health-care facility, for a doctor to make a diagnosis or diagnoses, a detailed and accurate history should be taken from the patient. This history is the story of the patient's medical disorders. In an ophthalmic setup the OA collects the history. A history is taken by asking a series of specific questions linked in an orderly sequence in order to help the ophthalmologist diagnose the patient's condition.

Two types of patients are seen in eye hospitals

A. The patient who desires a routine ocular examination combined with a refraction and

B. The patient with symptoms of ocular disorders.

The OA should be able to determine which category the patient is in, collect the appropriate data precisely, and know what information is relevant to the case. Sometimes a patient with multiple systemic disorders may say that they are in excellent health overall, but then, when questioned, may answer that they are taking pills for hypertension, iron tablets for anemia, or injections for diabetes. The patient may not connect a general systemic disorder with their ocular problem. Systemic diseases can cause both major and minor complications in the eye.

It is very important to note here that the history must be very simple, clear, and accurate. Following stories illustrate the importance of taking an accurate record.

Story (with systemic ramifications) regarding insulin / penicillin

The OA asked the patient if she had any allergic reactions to medications. The patient replied, "Yes, penicillin." The OA recorded it in the patient's chart as, "Insulin". After surgery the patient developed an infection and penicillin was prescribed by the doctor. He was not aware of her allergy because of the incorrect history record. The patient almost lost her life due to this error. Her relatives wanted to know why the doctor had not observed her allergy and they checked the record and found out that insulin had been mistakenly recorded instead of penicillin.

Story (with ocular ramifications) regarding diamox / diuril

The OA asked the patient, "What medication are you now taking?" The patient was taking diamox for a severe glaucoma condition. But the OA recorded it as diuril in the chart (which is also a diuretic, but it does not lower intraocular pressure like diamox). After surgery the doctor ordered the patient to continue with the regular medications. The OA looked at the chart, and had noted Diuril (not Diamox) and followed the doctor's orders. The patient's intraocular eye pressure increased over a period of several days causing some glaucomatous damage (to the optic nerve and thus causing the vision to decrease). Finally the error was discovered and appropriate medication was given. Damage to the optic nerve had resulted from this mistake which was irreversible.

History taking must be accurate and to the point, so use these methods to ensure that you are listening carefully to the patient.

- Restate the patient's answer to your question. They can clarify the answer if misheard or if a similar sounding medication is put on the chart. We are dealing with people's lives, so it is vital to get all information right in their record.
- Take notes on a paper as the patient tells you about their problem. Look them in the eye/Look at their eyes and talk to let them know that you are interested and concerned about their problem.

Organise the information in a chronological order (arranged in order of occurrence). The doctor will appreciate this very much.

- Write down the pertinent facts on the medical form in the order of occurrence. Leave out all the unimportant information that the patient may tell you. Sometimes the patients will go into great detail and much of this may not be relevant to the chief complaint. Sometimes the patient needs to talk to someone, therefore, be polite but guide the patient back to the chief complaint. The doctor will be so appreciative if you can let the patient unwind with you and not take his valuable time.

It is important that the OA make the patient feel comfortable as only then will the patients share their complaints. The OA should not refrain from asking a particular question because it appears to be too private or embarrassing. If the history is conducted in a frank and professional manner and the questions are posed with tact and good taste, the patient will reveal even the most private matters, just as they would remove a shirt for chest examination. Some patients may refuse to speak to anyone except the physician about their eye problems. This is the patient's privilege. These patients should be treated even more carefully and tactfully. The OA should not attempt to interpret a statement made by the patient, as this will waste the valuable time of the ophthalmologist.

Elements of a case history

There are four types of history collection, problem-focused, expanded problem-focused, detailed, and comprehensive. All of these will include some or all of the following elements

1. Chief complaint

The patients will tell about their ocular problems and describe their symptoms and in the case history this usually should be written out in the patient's words. The OA should be able to determine from the outset whether a case is an emergency, and how vital it is that the patient sees a doctor soon.

2. Present ocular history

To help the patient describe the chief complaint, the OA can ask the following questions:

- What are your symptoms?
- When did the symptoms start? Start with the distant time (for example 1-1/2 years), and work toward the present. Complaints can change, such as light flashes, then floaters, then half of the vision is gone and the patient only sees a black shadow in half of his visual field.
- Does the symptom seem to be getting worse?
- Are you taking any eye-related prescription medications or drops? What type, dosage and frequency?

Depending on the patient's answer, the OA can ask for a chronological description of the development of the patient's present illness. This may include the following elements:

- What is the status of your vision?
- When was the onset of your symptoms?
- Describe your present symptoms.
- Has there been any previous treatment of the symptoms?

To derive these elements the OA can ask the following questions

- Have you experienced any change in your vision? Have you noticed a decrease in distance or near vision? Has your vision been affected in one eye or both eyes?
- Did the symptom start all of a sudden or gradually?
- Is it stationary or progressive?
- Where exactly is the problem?
- Are symptoms constant or just occasional? If it is occasional, how long do they last?

- What is the severity of the problem? For example, if the problem is pain, ask whether the pain is sharp or dull
- Does the symptom get worse with any other activity? Do the symptoms interfere with your work or other activities?

3. Past ocular history

- Any previous eye injuries or diseases? What type? When were they first diagnosed and treated? What was the duration?
- Any previous eye surgery? Trabeculotomy for glaucoma, laser procedures for diabetic retinopathy)? When?
- Do you wear glasses or contact lenses, and how is your visual acuity with your RX / CTL?

4. General medical history

- Are you suffering from diabetes, high blood pressure, heart disease, asthma, or another medical condition?
- What medicines you are taking (Insulin, Digitalis, Eltroxin, Diuretics, Aspirin, etc.)? Ask them to show the medicine if they have. Sometimes they will not know the name of the medication. They may say the colour or shape of the tablets. Do not assume the name of the medicine and come to a conclusion. If the patient is unable to tell the name of the medicine, write the same in the record.
- Any previous general surgery?

5. Family medical history

- Do any diseases run in your family? Do you have blood relatives living or dead who have had blindness or any eye disease?
- High blood pressure? Heart disease? Strabismus? If diabetes, then type and onset?

6. Occupation

7. Allergies

- Do you have allergies? If so, what are the possible causes of your allergies? Are you taking oral or topical drugs that may be allergic to you?

Specific complaint examples

1. Patient exhibits red eye(s)

Questions to ask

- How long has the eye been red?
- Has there been any trauma to the eye?
- Has any foreign substance been introduced to eye (shampoo, dirt)
- Do you have any allergies?
- Do you have any pain? How long?
- Do you feel an irritation, or do you sense a foreign body in the eye?
- Does your eye itch?
- Do you have increased sensitivity to light (photophobia)?
- Is there any discharge from the eye? If so, what colour (clear, white, or yellow-white)?
- Have you experienced a decrease in vision?
- Has the eye been treated at all for the redness?
- Do you have a headache, or vomiting?
- Have you taken any medicine?

Diagnoses to consider

- Conjunctivitis
- Iritis
- Angle-closure glaucoma
- Contact lens overwear
- Dry eyes
- Postoperative iritis
- Pingecula
- Pterygium
- Subconjunctival haemorrhage
- Penetrating foreign body or injury (if patient is carpenter or lathe worker)
- Blepharitis
- Trichiasis
- Foreign body in eye (dust or stone particles, flying iron dust)

2. Patient complains of decreased vision

Questions to ask

- How long has your vision been affected?
- Which eye / If both eyes which eye is worse
- If unilateral when did you notice the reduction in vision?
- Has the decrease been gradual or sudden?
- Has your near vision or distance vision been affected (or both)?
- Whether the decreased vision occurs during the day or at night (or both)?
- Has it been getting worse?
- Are you in pain?

Diagnoses to consider

- Cataract(s)
- Old prescription
- Onset of presbyopia
- Optic neuritis
- Retinal detachment
- Diabetic retinopathy with CSME
- Vitreous haemorrhage
- Diabetes-related eye problems
- Unilateral-amblyopia, CSR, etc.

Tips for Winning the confidence of the patient

As stated previously, it is very important that the OA make the patient feel comfortable, as only then they will share their complaints without inhibition.

To win the patient's confidence, it is important that the OA be cleanly and neatly dressed, and that they handle the patient patiently and compassionately, being attentive and listening to the patient's symptoms without interrupting them. Here are a few easy but important ways to exhibit your concern:

- Introduce yourself (My name is ...., I will be working with you for a few minutes to record your ocular problem).
- Explain that in order to get the best care and treatment from the doctor, you need to record a few important facts about the problem.
- Make sure your attitude toward patient is friendly; (be sensitive and smile frequently) Treat them cordially, so that they feel you are interested in them as a total person and not just for their eye problem.

The OA can improve their interactions with the patients by assuming that someone they love most or respect most is always at their side watching and listening to their interactions with others so this will make a difference in their daily behaviour towards other people. If you take this assignment to heart, it will change your attitude and you will become a more sensitive and positive thinking person with whom people will enjoy associating. It will make a difference in how you treat your patients.

Summary

A systematic order should be followed in taking an adequate history.

Key elements of history taking

- Identify the chief reason the patient seeks an eye examination.
- Identify any secondary problems the patient has that are related to the eye.
- Identify any systemic or general illness the patient presently has and any medication being taken.
- List past ocular disorders and/or operations.
- Determine if the patient is wearing contact lenses or spectacles, and if so, how old they are and when the last eye examination occurred.
- Be brief but also go into detail with any specific ocular problem that arises. General questions regarding abnormalities may be important, such as time and duration, family involvement, and so on.
- Record any previous treatment and the response.
- Never talk ill about any treatment taken outside, or about the doctor who has treated the patient.
- Always ask for referral letters.

Medical terminology

VA	- Visual acuity
RX/CTL	- Treatment/Contact lens
BP	- Blood Pressure
BS	- Blood Sugar
FB	- Foreign Body
DWSCTL	- Daily-Wear Soft Contact Lens
CSME	- Clinically Significant Macular Edema

Student exercise

I. Write true or false?

1. *History taking is a confidential experience with the patient and the OA who is involved. (True/False)*
2. *The most significant question is what medication are you taking. (True/False)*
3. *The patient should be allowed to speak freely about all their problems. (True/False)*

II. List and describe the essential elements of a complete problem oriented medical case history.

External examination of the eye

After the OA takes preliminary information about the patient and their disease, and records it in the case sheet, the OA begins an external examination of the patient's eye.

First they ask the patient to close the eyes and throw light on each eye to rule out lagophthalmos or improper closure of eyelids.

The OA should begin the external examination of each eye by systematically noting the symmetry of the orbit, the lid margins, the conjunctiva, the lacrimal apparatus, the sclera, the cornea, the iris, the pupil, extra ocular movements, squint and the lens. They should check the primary position of the eye ball and if there is deviation or diplopia, and check ocular motility.

Symmetry of orbits

In proptosis, there is protrusion of the eye globe. In such cases the upper lid is often retracted and there is exposed sclera above and below the cornea. Another method of determining the presence of proptosis is to stand behind the patient, draw their upper lids upward, and note which eye appears to bulge the most. The ophthalmologist may record the degree of proptosis with an instrument called an exophthalmometer.

Eye lashes

Cilia, or eyelashes, are hairs on the margins of the lids. They are located in two rows, totalling about 100 to 150 cilia on the upper lid and half that number on the lower lid. The bases of these cilia are surrounded by sebaceous glands (Glands of Zeiss). Infections of these glands result in a common stye. The average life of the cilium is from 3 to 5 months, after which it falls out and a new one grows to take its place. If the cilium is pulled out, the new one replacing it reaches full size in about 2 months. If the cilia are cut short, as is sometimes done preceding surgery on the eye, the growth is rapid and lashes may appear normal in a few weeks.

Lid margins

The lid margins should be observed for any redness, scaling, or discharge, indicative of blepharitis. The position of the lid margin should also be noted. It should be tight against the globe and not sag outward (ectropion) or inward (entropion). The punctum on the medial aspect of the lower eyelid should not be visible without depressing the lower eyelid. The more common affections of the lid margin are styes, chalazions, and growths. Sometimes posterior misdirection of cilia called trichiasis may be seen.

Conjunctiva

The bulbar conjunctiva is readily visible. The caruncle is seen as a fleshy mound of tissue at the inner canthus. The palpebral conjunctiva of the lower lid is seen by depressing the lower lid while the patient looks up toward the ceiling. The peripheral conjunctiva lining the upper eye lid can be seen only by everting the upper lid. Eversion of the upper eyelid is carried out by grasping the eyelashes of the lid between the thumb and index finger and turning the eyelid over a tooth pick or applicator. It is important that the patient should be asked to look downwards to relax the levator muscle. With eversion of the upper eye lid the tarsal conjunctiva is visible and the meibomian glands running vertically from the lid margin are easily seen. The bulbar conjunctiva should be inspected for growths such as pterygium and pinguecula. The palpebral conjunctiva should be inspected for follicles, discharge, pustules, chalazion, and hordeolum internum. Look for bleb.

Lacrimal apparatus

The presence of tearing in the absence of any other signs of inflammation of the lacrimal sac may be caused by a small, smooth elevation in the lacrimal fossa between the inner canthus and the nose. Pressure inward on this area will cause the contents of the lacrimal sac to be expressed through the puncta onto the conjunctiva. It should be noted whether the contents from the lacrimal sac are tears, mucus, or purulent material. Deficiency of tears is best measured by Schirmer test.

Sclera

The normal sclera is visible beneath the conjunctiva as a white, opaque, fibrous structure. Blue discolouration of the sclera may be normal in a very young child because of the sclera's thinness and the underlying prominence of the dark choroid. Blue discolouration in an adult invariably indicates a pathologic condition; it may signify a tumour, a thinning of the sclera with a protrusion of the underlying uvea (Staphyloma), or a nevus. In the elderly the sclera may appear yellowish because of the presence of fat and other degenerative substances.

Cornea

The normal cornea should be smooth, shiny, and free of irregularities. In children when the corneal diameter is 12 mm or more and the cornea is hazy it is indicative of congenital glaucoma. In elderly people a white ring is frequently present near the corneal periphery. This creamy white ring is due to the deposition of lipid and is called arcus senilis. The cornea is normally free of blood vessels. The presence of blood vessels indicates a pathologic condition and disease. Corneal edema can often be seen with the naked eye because of its characteristic ground-glass appearance. Corneal opacities may be detected by oblique illumination with a small flashlight. Any acute white lesion in the cornea with conjunctival congestion, one should suspect corneal ulcer.

Corneal sensation should be tested with a small wisp of cotton directly applied to the cornea. Explain the procedure to the patient. In this test the patient is instructed to look up. Normally a blink response should occur, if the corneal sensation is normal. It is important that the patient should not see the cotton approaching the eye, as the visually- evoked response of seeing a foreign object approach the eye will also cause a blink response. Because of the wide range in individual response, comparison of the corneal reflexes of both eyes is most useful. Loss of corneal sensitivity follows herpes simplex virus infection and brain disease involving the fifth nerve.

Iris

The iris is normally brown in colour; usually the colour is the same in both eyes. A difference in the colour between the two irises (heterochromia) may be indicative of a congenital abnormality, iris tumour, retained intraocular foreign body (siderosis), or old iritis.

The iris is normally well supported by the underlying lens. Tremulousness of the iris, or undulating movements of the iris structure, is called iridodonesis. It is seen in subluxated lens, posterior dislocation of lens and surgical aphakia. It is best seen by asking the patient to look quickly from one point of fixation to another.

Anterior chamber

By shining a small pen light from the side, one can make an estimation of the depth of the anterior chamber. If the anterior chamber is shallow, it should be so recorded. Never dilate eyes with shallow chamber. It should be recorded in the case sheet in Red ink.

Pupil

The OA can test pupillary function with no special instruments except a small light. The following points should be noted in the examination of pupillary function.

Pupillary reflex

For assessment of the direct light reflex, the patient should be seated in a dimly illuminated room, with the light evenly distributed throughout the room and close one eye. Then a small ray of light is brought from the side and shown directly on to the pupil of the other eye. The normal direct light response causes constriction of the pupil on that side.

For assessment of the consensual light reflex, light is directed into one eye while the other eye is observed. An intact consensual response to light causes constriction of the pupil of the non-illuminated eye.

Normally, where an object is viewed close at hand, three associated reactions occur; convergence of the eyes toward the object, accommodation, and pupillary constriction. These three reactions should not be considered a true reflex, because one may occur without the other. For example, even after dilating both eyes with a mydriatic agent, the patient may still be able to converge.

Lens

By showing the light from a pen torch, the clarity of the lens can be assessed. If iris shadow is seen, it is an immature cataract. If no shadow is seen it is a mature cataract. If the colour of lens is yellow, brown or black it is a nuclear cataract. Lens changes should always be correlated with visual acuity. Absence of lens is called Apakia. If the margin of the lens is seen or if there is shaking of the lens one should always suspect subluxation of the lens

Summary

The OA helps the doctor by recording the initial information about the patient in the case sheet. OA has to examine external parts of the eye systematically and record the findings in the case sheet. OA has to give instructions to patients wherever necessary. Here are some key points to remember:

- Check primary position of eye ball if there is deviation or diplopia
- Sclera, cornea, iris and anterior chamber, pupil and lens can be evaluated by the OA to reduce the doctor's time in the diagnosis
- Abnormalities can be checked and informed to the doctor
- Check ocular motility
- While conducting corneal sensation test, explain the procedure to the patient
- Never dilate eyes with shallow chamber

Student exercise

Fill in the blanks

1. *-----------are hairs on the margin of the eye lids.*
2. *---------------is seen as a fleshy mound of tissue at the inner canthus.*
3. *Deficiency of tears is best measured by ----------test.*
4. *In elderly people the -------------------may appear yellowish because of the presence of fat.*
5. *The cornea is normally free of ---------vessels.*

Answer the questions

1. *What is lagophthalmos?*
2. *What is proptosis?*
3. *Explain ectropion and entropion.*
4. *Write short notes on:*
   a. cornea
   b. conjunctiva
   c. iris
5. *How do you assess pupillary action?*

Visual acuity

Definition

Visual acuity is the power of the eye to distinguish objects from one another by their size and shape. It is also a measure of the smallest retinal image which can be appreciated regarding its shape and size. It applies to central vision only. Visual acuity is the medical term for sharpness of vision. It deals with the sharpness, or discrimination, of central vision, rather than the peripheral.

Testing visual acuity

Two distinct points can be visible as separate when the minimum angle subtended by them at the nodal point of the eye is one minute. This is the standard of normal visual acuity. This standard of visual acuity is measured by the minimum angle subtended at the nodal point of the eye. Perfect acuity of vision requires two other basic factors; the light sense and the colour sense. The acuity of vision is tested by standard vision chart known as the Snellen's chart (Fig. 2.1).

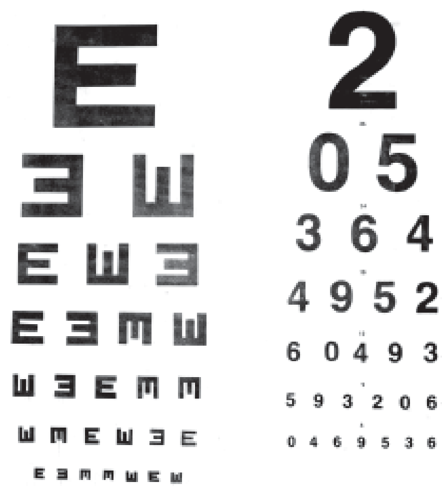


Fig. 2.1 - Snellen's chart

This is a familiar chart that many people have seen in school or community vision - screening programs. The chart consists of Snellen optotypes, specially formed letters of the alphabet arranged in rows of decreasing letter size. The sizes of the letters are standardized so that the letters in each row should be clearly legible at a designated distance to a person with normal vision. Patients sit at a specified distance, generally 6 meters from the chart and are asked to read aloud the smallest line of letters they can discern.

Why is the test performed? Vision testing is an important test in the eye hospital. All the patients should take this test. For small children special tests are available.

How is the test performed?

Overall visual acuity is measured by using the Snellen chart with the large E at the top followed by rows of letters, where each row is smaller than the previous one. A chart using the letter E facing up, down, left, and right is used for children and those who can not read (Fig. 2.2).

The eye chart is placed 6 meters away from the person being examined.

For someone wearing eyeglasses, the first test is performed without glasses. The left eye is covered by the palm of the patient without touching the eye.

Fig. 2.2

The patient is to read from the top line to the lowest line possible. Then visual acuity is recorded. The patient is advised to cover the right eye. The vision is recorded for the left eye.

Repeat with distance correction

A reading of 6/6 or 20/20 is normal vision, meaning that the smallest symbol that can be read at a distance of 6 meters is the same as the symbol that a person with normal vision would detect at that distance. A 6/18 or 20/40 reading means that the person can read at a distance of 6 meters what a person with normal vision reads at 18 meters. A person whose vision can not be corrected to 6/60 or 20/200 in the better eye is considered legally blind.

Children

The physical and psychological preparation you can provide for this or any test or procedure depends on the child's age, interests, previous experiences, and level of trust. For specific information regarding how you can prepare the child, following topics are presented.

Vision screening tests for an infant

The following are some of the ways in which an infant's vision can be tested:

- Response to light: An infant will blink in response to a bright light.
- Pupil response: Measuring the response of the pupil (the black centre part of the iris) to a shining penlight on the eye.
- Ability to fix and follow: The most common visual acuity test in infants is a test to check their ability to look at and follow an object or toy.
- Visually evoked response testing: These are tests that stimulate the eyes with either a bright light or special pattern. The infant is connected to a special monitor with attachments on the infant's head. The machine then records electrical activity in the brain as the lights and patterns are shown to infants.

Visual screening tests for a Toddler

Many of the above tests may be performed, in addition to the following:

- Cover / uncover test: This test looks for movement and alignment of the eyes that may occur when a child is focusing on an object. One eye is covered with an opaque card while the child stares straight ahead, at which time the examiner observes the uncovered eye.

Visual screening tests for a preschooler (usually around age 3)

The same tests as used for the toddler, in addition to the following tests are done:

- Visual acuity tests: Specific tests and charts may be used to measure both near and distant vision. For the preschooler, these charts may consist of pictures or stories instead of letters of the alphabet.
- Ishihara colour plate: This test helps to determine colour blindness in a child above the age of 5 years.

Normal values

Visual acuity is expressed as a fraction. The top number refers to distance one stands from the chart. This is usually 6 meters. The bottom number indicates the distance at which a person with normal eyesight could read the same line.

For example, 6/6 or 20/20 is considered normal. 6/18 or 20/40 indicates that the patient correctly read letters at 6 meters which could be read by a person with normal vision at 18 meters.

Abnormal results may indicate that corrective lenses are needed to obtain normal vision. Some of the vision problems are:

- Nearsightedness
- Farsightedness
- Astigmatism
- Presbyopia

Colour vision

The colour of any object is determined by the wave length emitted or reflected from the surface. White light is a mixture of wavelengths of the visible spectrum. Colour is perceived by three populations of cone photoreceptors in the retina which are sensitive to light of short (blue), middle (green) or long (red) wave lengths.

A congenital colour vision defect occurs if a cone pigment is absent or if there is a shift in its spectral sensitivity. Hence, deuteranopia, protanopia and triternopia indicate absence of green, red and blue cone function, and deuteranomaly, protanomaly and tritanomaly indicate a shift in the corresponding cone sensitivity. The X-chromosome carries genes encoding for red and green pigment where as other chromosomes carry the blue pigment gene. 8% of men and 0.5% of women have a defect of the red/ green system; the most common is deuteranomaly which occurs in 5% of men and 0.3% of women. Tritan defects are rare.

Congenital colour defects characteristically affect particular parts of the colour spectrum. Acquired colour defects occur throughout the spectrum but may be more pronounced in some regions.

For example, acquired optic nerve disease tends to cause red-green defects. An exception occurs in glaucoma and in autosomal dominant optic neuropathy which initially cause a predominantly blue-yellow deficit; it has recently been found that visual field loss in glaucoma is detected easier if perimetry is performed using a blue light stimulus on a yellow background. Acquired retinal disease tends to cause blue-yellow defects. Clinical tests of colour vision are designed to be performed in illumination equivalent to afternoon daylight in the northern hemisphere.

The following tests are done to detect colour vision defect

- The Farmsworth - Munsell (FM) hue 100 test.
- D - 15 test
- Ishihara Pseudochromatic test plates: Various combinations of colours are used to identify the nature of the colour vision deficit.

The hue test, or Farnsworth-Munsell 0-15 test, provides a more precise determination of colour vision deficits. The test consists of 15 pastel-coloured chips of similar brightness but subtly different hues, which the patient must arrange in a related colour sequence. The sequence is obvious to patients with normal colour vision, but patients with colour deficiencies make characteristic errors in arranging the chips.

Common abbreviations in visual acuity measurement

V, VA	= visual acuity
OD or RE	= oculus dexter, right eye
OS or LE	= oculus sinister, left eye
CC	= cum correctio, with correction (eye glasses or contact lenses
SC	= sine correctio, without correction (eye glasses or contact lenses)
Ph	= pinhole
CF	= counts finger
HM	= hand motion
LP	= light perception
LPP	= light perception with projection
NLP	= no light perception
PG	= present glass
BCVA	= best corrected visual acuity

Instruments required

Occluder: a hand-held paddle used to cover one eye during a test

Pinhole paddle: a hand – held paddle with small viewing holes, used to determine whether spectacle lenses are likely to improve vision

Projector: required if a projected image of the test chart is to be used

Mirror: required to obtain the correct optical distance between the patient and the chart when the physical distance is too short

Snellen's chart: for adults and children who know the alphabet or numbers

Tumbling E chart: for children and those who cannot read

Letter-matching tests: (20 to 10 feet): The children need not know the letter but they only need to match whatever letter you point to

Teller acuity cards: With vertical black and white stripes (gratings) to test the visual acuity of infants and preverbal toddlers (the examiner watches for a shift in gaze through a pinhole in the card)

Summary

In this unit the OA learns about the different types of charts used for vision testing and evaluating vision. The OA understands the advantages and disadvantages of all the charts and selects the appropriate chart according to the age group and type of visual defects. The key points to remember:

- Visual acuity is the medical term for sharpness of vision.
- The standard of visual acuity is measured by the minimum angle subtended at the nodal point of the eye.
- Snellen's chart is used to measure the visual acuity
- The eye chart is placed 6 meters away from the person being examined
- Visual acuity is expressed as a fraction

Student exercise

I. Expand

1. OD or RE

2. CC

3. HM

4. CF

5. NLP

II. Fill in the blanks

1. *An infant will-----------in response to a bright light.*
2. *-----------------test helps to determine colour blindness in a child.*
3. *Visual acuity is expressed as a -----------------.*
4. *----------------is considered as normal visual acuity.*
5. *-------------- and -----------------tests are conducted to detect colour vision.*

III. Answer the following

1. *Define visual acuity.*
2. *Why is the visual acuity test performed?*
3. *How is the visual acuity of a person tested?*
4. *List the different types of visual acuity tests.*
5. *Write short notes on: Colour vision, pinhole paddle, mirror, teller acuity cards.*

Measuring intraocular pressure

Definition of intraocular pressure (IOP)

Intra-ocular pressure refers to the pressure exerted by the contents of the inside of the eye on the eyeball. Its equilibrium is maintained by the aqueous humour formation, its outflow by the episcleral venous pressure.

Normal IOP values

- Ranges between 10.5 and 20.5mm of Hg
- Mean IOP = 15.5mm of Hg
- Higher-than-normal IOP measurements indicate possible glaucoma

Measurement of IOP

1. Direct measurement (Manometry)

- A needle is introduced into the anterior chamber and is connected to a suitable mercury manometer
- Disadvantage: Not a practical method for routine IOP measurement

2. Tonometry or indirect method

- An indirect method of measuring IOP with instruments called tonometers
- Types of tonometer
  i. Indentation or impression tonometers (e.g., Schiotz)
  ii. Applanation tonometers (e.g., Goldmann applanation tonometer)

Schiotz tonometer

Schiotz tonometer was first devised in 1905. Schiotz indentation tonometer works on the fundamental fact that the plunger will indent a soft eye more than a hard eye (Fig. 2.3).

Parts of a Schiotz tonometer

- Handle for holding the instrument in vertical position on the cornea.
- Foot plate which rests on the cornea.
- Plunger which moves freely within a shaft in the foot plate.
- A bent lever whose short arm rests on the upper end of the plunger and a long arm which acts as a pointer needle. The degree of indentation is shown by the movement of this pointer over a scale.
- Scale.
- Weight disc of 5.5gm is fixed to the plunger. Extra weights 7.5gm, 10gm and 15gm can be added to the plunger.

Fig. 2.3

Maintenance and sterilisation of a Schiotz tonometer

- Remove the plunger from the tonometer
- Soak the wiper in spirit and clean the plunger, foot plate, three weights, hollow shaft and the model cornea
- Fix the 5.5gms weight and plunger in the tonometer
- Heat the footplate over the blue flame of the spirit lamp for two minutes. Now the footplate is sterilised
- Keep the tonometer over the sterile wipers so that it cools down to room temperature
- Check the instrument by placing it over the model cornea. The indicator should show "0" on the scale. Ensure proper functioning of the instrument before each IOP recording and calibrate. To calibrate the tonometer, place the foot plate on the model cornea provided before examining each case. Scale reading of zero ensures proper calibration. If the pointer is between 1 and 0, the footplate needs to be cleaned again. Check again by placing the tonometer over the model cornea

- Always sterilize with an antiseptic solution the part of the instrument that will come in contact with the patient's eye
- Allow three minutes for the alcohol (sterilising agent) to dry to prevent alcohol keratitis
- After the measurement, remove the weights and unscrew the plunger to clean thoroughly
- Keep the instrument covered within the case when not in use

Practical usage of Schiotz tonometer

- Wash and dry your hands before using the instrument
- Always check the instrument before usage and calibrate
- Patient should lie supine facing the ceiling
- Explain to the patient that drops will be instilled in their eyes. It may cause a burning sensation. After one minute an instrument will touch their eye and it will not be felt
- Administer one drop of lignocaine 4% in the eye to be tested
- Allow 2 to 5 minutes for the local anaesthetic to act
- Rest your fingers only on the bony orbital rim and not over the eye ball
- Gently separate the lids
- Ask the patient to hold their hand up and look at the thumb or a finger to give them a point of fixation
- With the tonometer having no added weights (the instrument weighs 5.5gm) rest the foot plate on the centre of the cornea
- Look at the scale of the tonometer to find out the degree of indentation. If it indicates 3 or less, put the next heavier weight on the plunger and so on. When the scale reading is > 4 it is an ideal indentation
- Use the provided Friedenwalds conversion table for estimation of IOP'S
- Record the readings for each eye separately in the patient's chart

Chart for IOP calculation by Schiotz tonometry (Friedenwalds chart)

Schiotz scale reading	IOP in mm of Hg with different plunger body weights			
	5.5gm	7.5gm	10gm	15gm
3.0	24.4	35.8	50.6	81.8
3.5	22.4	33.0	46.9	76.2
4.0	20.6	30.4	43.4	71.0
4.5	18.9	28.0	40.2	66.2
5.0	17.3	25.8	37.2	61.8
5.5	15.9	23.8	34.4	57.6
6.0	14.6	21.9	31.8	53.6
6.5	13.4	20.1	29.4	49.9
7.0	12.2	18.5	27.2	46.5

7.5	11.2	17.0	25.1	43.2
8.0	10.2	15.6	23.1	40.2
8.5	9.4	14.3	21.3	38.1
9.0	8.5	13.1	19.6	34.6
9.5	7.8	12.0	18.0	32.0
10.0	7.1	10.9	16.5	29.6

Attitude

- Communicate well with the patient to reduce anxiety.
- Clear the patient's doubts by answering all questions.
- Assist the patient to maintain a comfortable position throughout the procedure.
- Handle the equipment with care.
- Communicate the results to the ophthalmologist.

Advantages of Schiotz tonometry

- Simple to use
- Low price
- Easy usage
- Portability

Disadvantages of Schiotz tonometry

- Patient has to lie supine
- Operator variability
- Cannot be done in patients with corneal pathology, infections, or changes in ocular rigidity.
- Errors in recording IOP

Sources of errors in recording IOP by Schiotz tonometry

- Error due to contraction of extraocular muscles.
- Error due to accommodation
- Error due to ocular rigidity
- Error due to variations in corneal curvature and thickness
- Error in scale reading and faulty technique
- Error due to usage of pressure on the globe

Non-contact tonometry

A Non-contact tonometer measures the IOP without touching the cornea. The patient is made to sit in front of the instrument, asked to keep their chin on the chin rest and fix their gaze at a red dot inside the machine. The OA adjusts the machine and triggers a puff of air onto the cornea which deforms the corneal apex. The time taken for deformation is converted to IOP (Fig. 2.5).

Fig 2.5 - Non-contact tonometer

A Non-contact tonometer can be used in patients with:

- Corneal abrasions
- Reaction to local anaesthetic
- Ocular surface infection
- And in mass screening
- Paediatric age group
- Uncooperative patients

Summary

In this section the OA has becomes familiar with the Schiotz tonometer and the Non-contact tonometer and has learned to use both types to measure the patient's intraocular pressure. OA knows how to give clear instructions to the patient about the procedure, and how only after clarifying all their doubts the OA can proceed with the test. Additionally, OA knows how to properly handle, maintain, and sterilize the equipment.

Key points to remember

Do's in measuring IOP by Schiotz tonometer

- *Explain the procedure and its importance to the patient in their own language in a gentle way.*
- *Always wash and dry your hands before working.*
- *Be gentle while separating the eyelids*
- *Take two to three readings when you find the values are abnormally low or high.*
- *Special care is required in eyes which are swollen after surgery or injury. In - patients who are unable to open their eyes voluntarily or when the patient is not co-operative, reassure the patient and resume work gently.*

Don'ts in measuring IOP by Schiotz tonometry

- *Do not rest your fingers over or on the globe.*
- *Do not do indentation tonometry in a red and inflamed eye / eyes with conjunctivitis, corneal pathology, and foreign body, in dry eye or in trauma.*

Student exercise

Fill in the blanks

1. *Normal IOP value is ----------------------.*
2. *Tonometry is ---------------------measurement.*
3. *If the pointer is between 1 and 0 -----------is to be cleaned again.*
4. *Heat the footplate over the blue flame of the spirit lamp for --------------.*
5. *Look at the scale of the tonometer to find out the degree of---------------. If it indicates --------, put the next heavier weight.*

Answer the questions

1. *What are the types of tonometers?*
2. *List the parts of a Schiotz tonometer.*
3. *Describe the methods of maintenance and sterilisation of Schiotz tonometer.*
4. *What are the advantages and disadvantages of using Schiotz tonometer*
5. *Write a short note on non-contact tonometer.*

Evaluation of the patency of lacrimal drainage apparatus

The Lacrimal apparatus constitutes those structures which are concerned with the formation, transport and drainage of tears. They are broadly divided into:

- Lacrimal gland
- Lacrimal passages

Lacrimal gland

This is situated along the antero-lateral position of the roof of the orbit. Lacrimal glands secrete tears and the tears drain into the conjunctival sac through lacrimal ducts.

Lacrimal passages

The lacrimal passage includes the following:

- Puncta: There are two lacrimal puncta one in each eyelid. They are situated near the medial canthus. The upper punctum is 6 mm from the medial canthus whereas the lower punctum is about 6.5 mm from the medial canthus.
- Canaliculi: There are two canaliculi in each eye, one in the upper eyelid and the other in the lower. The canaliculi continue from the punctum and transport the tears into the lacrimal sac.

There are 2 divisions of canaliculi

- Short vertical limb of about 2 mm which is proximal followed by
- Long horizontal limb, which continues from the vertical limb and ends in the common canaliculus which drains into the lacrimal sac. Horizontal limb is 8 mm in size.
- Lacrimal sac: This is an expanded structure situated in the lacrimal fossa measuring about 11-12 mm in length and 4-5mm in width. The lower end of lacrimal sac continues as nasolacrimal duct.
- Nasolacrimal duct: This is a long slender tube of about 18mm in length directed backwards, outwards and downwards. The nasolacrimal duct opens into the inferior meatus of the nose.

The tear fluid is secreted from the lacrimal gland and drains through the lacrimal ducts into the conjunctival sac. As a result of constant blinking, tear fluid is uniformly distributed and the cornea and conjunctiva are well lubricated. The tear fluid goes into the lacrimal sac through the lacrimal puncta and canaliculi. From the lacrimal sac, tears drain into the nose through the nasolacrimal duct.

Tests to evaluate the patency of the lacrimal passage

- Regurgitation test: Put pressure over the lacrimal sac area and look for regurgitation through the punctum.
- Fluorescein dye disappearance test: Instill one drop of fluorescein solution in the conjunctival sac and after 5 minutes look for the presence or absence of the dye in the conjunctival sac. Absence of dye indicates drainage.
- Jones test: Instil one or two drop of fluorescein dye in the conjunctival sac. Place a piece of cotton dipped in 2% Lignocaine in the nasal cavity. After 5 minutes look for the stain on the cotton which indicates patency.
- Dacryosystography: Inject a radiopaque material into the lacrimal sac, take sequential X-rays, and evaluate patency.
- Lacrimal scintillography: Injection of radioactive material into the lacrimal sac and visualisation with a Gamma camera.
- Chloramphenicol tasting test:

Instil two drops of chloramphenicol drops in the eye using pouch technique. The patient keeps the eyes closed for two minutes. Within five minutes the patient will appreciate the bitter taste of chloramphenicol when the NLP is patent.

Lacrimal syringing technique

This test involves the irrigation of the lacrimal passage with saline. The presence of saline in the nasopharynx indicates a patent Nasolacrimal Passage (NLP).

Instruments required for lacrimal syringing

- 2% Xylocaine eye drops
- Nettleship punctum dilator
- 2ml syringe with either
  - Disposable 26 gauge canula
  - Blunted and bent 26 gauge needle
- Normal physiological saline solution.
- A separate needle (or cannula) for each eye to prevent cross infection.

Indications: (When to use this technique)

- In persons with watering and discharge and clinically suspicious of obstruction of the lacrimal passage
- Before any intraocular surgeries and procedures.
- Following DCR / DCT to ensure the efficacy of the surgery.

Contraindications

- Acute exacerbation of chronic dacryocystitis
- Acute dacryocystitis
- Other painful conditions

Lacrimal syringing procedure

- The procedure and its importance in diagnosis is explained to the patient and they are reassured.
- Patient is asked to lie supine on an examination table (Fig. 2.5).
- Instil 2% lignocaine drops at the punctal region and into the conjunctival sac.
- Instruct the patient to indicate when flow of saline is felt in the throat.
- Ask the patient to look upwards, pull the lower lid down and laterally to straighten the lower canaliculus and evert the punctum away from the ocular surface.
- Take the syringe in the pen-holding position.
- Hold the lid in this position throughout and gently insert the cannula first vertically and then horizontally.
- Advance slowly into the middle of the canaliculus and irrigate.
- If difficulty is experienced in introducing the cannula/needle then the punctum may be dilated with a punctum dilator.
- Do not apply pressure while introducing the cannula/needle as it may result in injuries and create false passages.
- Inject saline with moderate pressure.
- If locating the lower punctum or introducing the cannula is difficult; syringing may be done through the upper punctum.
- Ask the patient to look down and hold the upper lid with thumb and ring finger. Stretch it down slightly and evert. Then see the upper punctum and pass in the cannula/needle.
- Ask whether the patient felt the flow of saline in the throat.
- In persons who can't feel the flow of saline through the throat 2-3 drops of chloramphenicol eye drops may be mixed and then asked whether they feel a sensation of bitterness in the throat.
- Interpret your results.
- Apply a drop of antibiotic eye solution to the conjunctival sac.
- Clean the areas surrounding the eye with a sterile cotton wiper.

Fig. 2.5

Interpretation of results

- Patent lacrimal passage: Free flow of saline through the lacrimal passages into the nose and throat.
- Partial obstruction: Flow of saline through the passages into the nose with considerable force of syringing. Part of the fluid goes into the nose and throat. Rest of the fluid regurgitates through the opposite punctum.
- Obstruction of one canaliculus: No flow of saline into the nose. Instead regurgitation through the same punctum. Subsequently syringing through the other puntum should show free flow of fluid.
- Obstruction of both canaliculi: No flow of saline into the nose and regurgitation of saline through the same punctum in both upper and lower canalicular syringing.
- Obstruction of the lacrimal sac or nasolacrimal duct or common canaliculus: Here no flow of saline into the nose, instead regurgitation of saline through the other punctum.

Advantages of syringing

- Simple test to be performed
- Less time consuming
- Cost effective test
- Can detect
  a. Presence or absence of obstruction
  b. Site of obstruction
  c. Partial or complete obstruction

Disadvantages of syringing

- Requires skill
- Chances of injuring tissues and creating false passages
- Not be performed in acute cases
- Chances of inducing infections if not properly done.

Here are some of the findings that can be observed while syringing

- Free of obstruction
- Partially free with clear fluid through the upper punctum
- Not free with clear fluid through the upper punctum
- Not free with pus through the upper punctum
- Not free with mucus through the upper punctum
- Not free with pus mixed with clear fluid through the upper punctum
- Not free with mucus mixed with clear fluid through upper punctum regurgitation of pus on pressure over lacrimal sac area (ROPLAS)
- Regurgitation mucus on pressure over lacrimal sac area
- Not free with clear fluid through the fistula
- Not free with clear fluid through the same punctum (UP)
- Not free with clear fluid through the same punctum (LP)
- Both canaluli blocked
- Both punctum blocked or either one of the punctum is blocked
- Lower punctum not seen and upper punctum seen.
- Upper punctum not seen but lower punctum seen
- Both puncta not seen
- On pressure over the sac swelling no regurgitation through the puncta , but fluid goes in to throat or fluid dripples through the nostril- it is called Atonic sac. After completely pressing this swelling the patient is made to lie down and lacrimal syringing is done slowly. Small swelling develops and gradually increases in size in the sac area. There is no regurgitation through the punctum and no fluid flow in the throat or nose.

Summary

This section teaches the OA about the lacrimal syringing. OA applies their knowledge in the anatomy of the eye lesson in this procedure. The lacrimal syringing technique is taught with the principle and how to interpret the results.

Key points to remember

- *Make the patient lie comfortably on the side of the eye to be syringed.*
- *As this is an invasive procedure, be gentle enough to manipulate the tissues.*
- *As this procedure involves participation of the patient, counsel and instruct the patient to inform you following the sensation of flow of saline in the throat.*
- *Do not give strong pressure on the cannula as it may injure tissues and may create false passages.*
- *Do not repeat the procedure unnecessarily.*

- *Exert more care in patients with swelling and in uncooperative persons who have the fear of being syringed.*
- *Be observant in finding from where the fluid regurges if any and the amount of force required to irrigate.*
- *Do not syringe in persons with painful swelling in the sac region i.e. acute dacryocystitis, lacrimal abscess etc..*
- *Gentleness plays a key role in the successful lacrimal syringing*

Student exercise

Answer the following

1. *What are the ways to evaluate the patency of lacrimal passages?*
2. *How to perform lacrimal syringing?*
3. *How to interpret the results of syringing?*
4. *Write short notes on:*

   a. Canaliculi

   b. Nasolacrimal duct

   c. Equipment required for lacrimal syringing

CHAPTER 3 BASIC REFRACTION

CONTENTS

Types of refractive errors and their management
Strabismus management
Visual field
Low vision aids

GOALS

To acquaint the ophthalmic assistant with the basic concepts of refraction, visual fields, strabismus and low vision and their contributions to clinical practice.

OBJECTIVES

The OA will be able to

- Define myopia, hypermetropia, astigmatism, presbyopia, anisometropia, and anisekonia
- State signs and symptoms of the above
- Describe the correction of the above
- Understand the method of performing different types of visual fields tests.
- Define the terminology associated with visual fields and the limits of normal visual fields measurements
- Demonstrate the procedure to measure binocular and monocular field limits for driver's license
- Explain effective methods for measuring visual field limits
- List the steps necessary to perform a confrontation visual field test
- Identify the characteristics of the various visual field testing methods
- Identify and instruct the patient about the relevance of low vision aids

CHAPTER 3
Basic Refraction

Basic refraction is carried out to evaluate the visual acuity of the patient's eyes visual acuity is dealt in detail in Chapter 2 (page. 17).

Types of refractive errors and their management

In perfect vision, the image is focused onto the retina, just as a camera has to be focused properly in order to take a clear picture. If the image is not focused exactly on the retina, the image will be blurred, just like an out-of-focus photograph. In this case, the person is said to have a refractive error.

1. Myopia/short-sightedness

Near-sightedness is an error of visual focusing that makes distant objects appear blurred. It is also called myopia or short-sightedness (Fig.3.1).

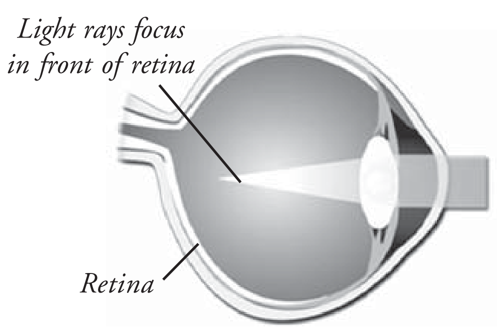


Fig. 3.1 - Myopia

Causes, incidence and risk factors

A near-sighted person sees near objects clearly, while objects in the distance are blurred. As a result, someone with myopia tends to squeeze the eye lids when viewing far away objects. A near-sighted person can easily read the Jaeger eye chart (the chart for near reading), but finds the Snellen eye chart (the chart for distance) difficult to read. Blurred vision results when the image is focused in front of the retina, rather than directly on it. A normal eye's lens and cornea focus light on the retina. In a myopic eye the light is focused in front of the retina and so the image is blurred

Myopia occurs when the physical length of the eye is greater than the optical length. Near-sightedness often increases in the rapidly growing school-aged child or teenager, and progresses during the growth years, requiring frequent changes in glasses or contact lenses. It usually stops progressing as growth is completed in the early twenties.

Clinical types of myopia

Near-sightedness affects males and females equally, and those with a family history of near-sightedness are more likely to develop it. Most eyes with near-sightedness are entirely healthy, but a small number of people with myopia develop a form of retinal degeneration. Early diagnosis of near-sightedness is important, since a person can suffer socially and educationally by not being able to see well at a distance.

Myopia can present itself in three categories

- **Congenital myopia:** This is present at birth and may be unilateral or bilateral. Bilateral congenital myopia may be associated with squinting (strabismus).
- **Simple myopia:** This type of myopia is not associated with any degenerative changes in the eye. It is the most common type of myopia. The power of glasses increases usually during the years of study in school and college and then remains steady.
- **Pathological myopia:** This type of myopia rapidly progresses and there are degenerative changes in the retina.

Symptoms of myopia

- Blurred vision or squeezing the eyelids when trying to see distant objects. (Children often cannot read the blackboard, but easily read a book). Near-sighted people tend to go near the objects to see them.
- Eye strain
- Headaches (uncommon)

Signs that may indicate myopia

- Sitting close to television
- Holding books very close when reading
- Having difficulty seeing the blackboard in school, or a wall menu in a Restaurant, place names in the bus

Relevant tests

- Visual Acuity test, both for distance (Snellen), and near (Jaeger)
- Refraction test to accurately determine the refractive error.
- Colour vision test to exclude colour blindness
- Muscle balance test
- Slit lamp examination of the eyes
- Measurement of the pressure of the eyes
- Retinal examination

Treatment

Properly prescribed spectacles (minus lenses) or contact lenses will enable the person to see clearly. The lens diverts the incoming light rays, so that they are correctly focused on the retina.

There are also a number of techniques available for reshaping the cornea (the front surface of the eye), in order to reduce its power and thus correct myopia. One technique (known as orthokeratology or "Ortho-K") uses rigid contact lenses to change the shape of the cornea. Other techniques use surgery to remove tissue from the cornea, leaving it with a flatter surface. Near-sightedness is easily corrected by eyeglasses or contact lenses, which shift the focus of the image on the retina.

Radial keratotomy is a surgical procedure popular recently. It has been almost completely replaced by LASIK, in which an excimer laser is used to reshape the cornea.

Complications

- Complication associated with the use of contact lenses: possible corneal ulcers
- Complications in laser vision correction are uncommon, but can be serious
- People with myopia may develop retinal detachments or retinal degeneration
- If a person with near-sightedness has flashing of lights, floating spots, or a sudden loss of any part of the field of vision, it may indicate a retinal detachment.

2. Hypermetropia / far-sightedness

In far-sightedness, there is difficulty in seeing objects which are nearby. It is the result of the visual image being focused behind the retina rather than directly on it. It may be caused by the eyeball being short or the focusing power being too weak.

Far-sightedness is often present from birth, but children can often tolerate moderate amounts without difficulty, and most outgrow the condition. As aging occurs, glasses or contact lenses may be required to correct the vision. A family history of far-sightedness is a risk factor.

Clinical types of hypermetropia

- Simple or developmental hypermetropia: This is the most common type, and exists from birth. As the baby ages, the eyeball grows in size and the hypermetropia gradually diminishes (Fig. 3.2). If the growth of the eye is retarded however, the hypermetropia persists.
- Acquired hypermetropia: This is found in aphakia, a condition common following extraction of the lens for cataract. This hypermetropia is usually high. (+10.00)

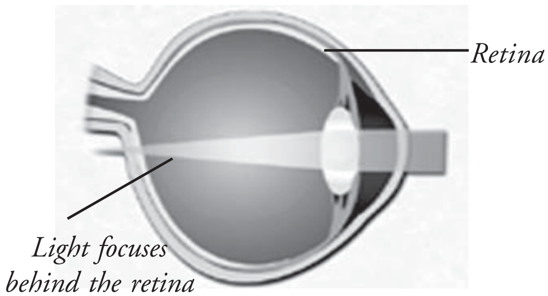


Fig. 3.2 - Hypermetropia

Effects of accommodations on hypermetropia

Accommodation has considerable influence on hypermetropia as this error may be fully or partly corrected by accommodation. Depending on accommodation, several types of hypermetropia are described (Fig. 3.3).

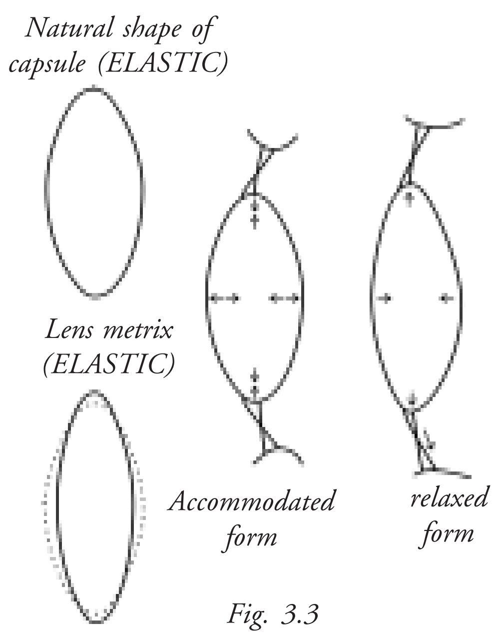


Fig. 3.3

- **Total hypermetropia :** This is the type of hypermetropia which is elicited after complete paralysis of accommodation, (as after application of Atropine) we can detect the strongest glass with which maximum visual acuity can be obtained. This is total hypermetropia.
- **Latent hypermetropia :** This is the amount of hypermetropia which is corrected by the normal tone of the ciliary muscle. It is more in young children than in elderly persons, as the tone of the ciliary muscle is much stronger in the young than in adults.
- **Manifest hypermetropia:** This is the hypermetropia which remains uncorrected in normal circumstances, that is when accommodation is not being actively exerted (Fig 3.4). This may be divided into two
- Facultative (that part of accommodation which can be overcome by active exertion of accommodation)
- Absolute (that part of accommodation which cannot be overcome by the exertion of accommodation)

Complications

Hypermetropia can be a risk factor for glaucoma

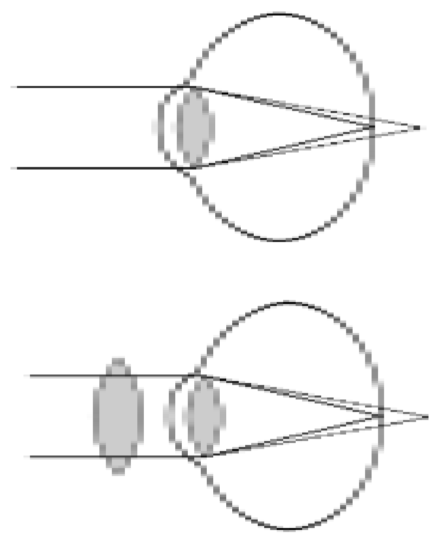


Fig. 3.4

Treatment

Far-sightedness is easily corrected with glasses or contact lenses. Surgical techniques are available for correcting far-sightedness and can be used for those who do not wish to wear glasses or contacts. (Fig.3.4)

3. Astigmatism

Astigmatism is a focusing error which causes asymmetric blur. Some directions in an image are more out of focus than others. This can be contrasted with short - sightedness (myopia) where all directions are uniformly blurred.

In astigmatism the cornea is oval. Most astigmatic corneas have two curves - a steeper curve and a flatter curve. This causes light to focus on more than one point in the eye, resulting in blurred vision at distance or near. Astigmatism often occurs along with myopia or hypermetropia or far-sightedness.

Astigmatism causes different amounts of blur in different directions. It causes images to appear distorted, or sometimes even double. Certain letters may be more difficult to read than others, depending on the orientation of the lines within them.

Causes of astigmatism

Most Astigmatism is caused by the shape of the front surface of the eye (the cornea). It can also be caused by slight tilting of the lens inside the eye. It may be an inherited characteristic or a normal variation accompanying growth.

Objects at all distances are indistinct or blurred and the eye cannot focus. Even slight degrees of astigmatism may encourage headaches and fatigue, and reduce concentration. (The eyes try, without success, to correct the blur. There is a tendency to squint to see better, producing discomfort in the muscles of the eyelids and face needs correction)

Types of astigmatism

- Regular astigmatism : When the refractive power changes uniformly from one meridian to the other.
- Irregular astigmatism : When the refractive power changes irregularly in different meridians as seen in corneal facets.

Regular astigmatism may be of three types

Simple astigmatism: One focal line falls on the retina and the other falls either in front of or behind the retina, when the eye is at rest. When one focal line falls in front of the retina the other line is formed on the retina, the condition is known as simple myopic astigmatism. Similarly, in simple hypermetropic astigmatism one line is formed behind the retina and the other on the retina.

Compound astigmatism: Both the focal lines are formed either in front of the retina when it is called compound myopic astigmatism or behind the retina, when it is called compound hypermetropic astigmatism (Fig. 3.5).

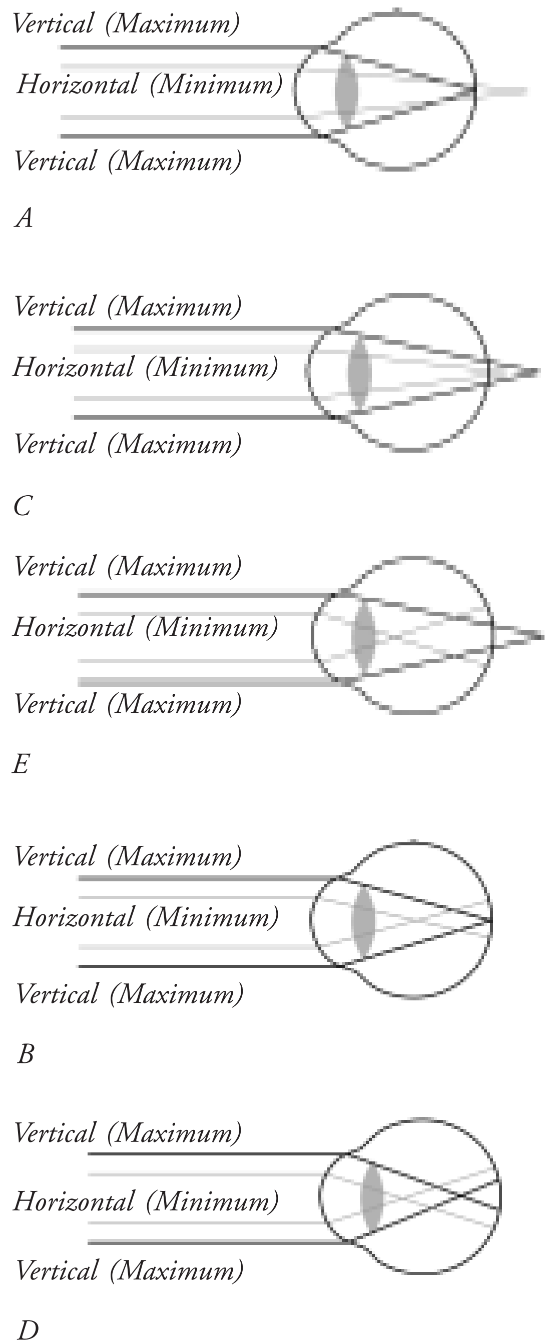


Fig. 3.5

Mixed astigmatism: One of the focal lines is formed in front of the retina and the other behind the retina.

Symptoms of astigmatism

- Diminished visual acuity
- Headache

Astigmatism can be detected and measured with corneal topography, keratometry, vision testing, and refraction.

Treatment

- In regular astigmatism the error can be corrected by suitable cylindrical lens, the exact power being determined by retinoscopy
- In case of irregular astigmatism, contact lenses have to be used

Astigmatism correction

Cylindrical lenses in spectacles or contact lenses can be used to correct astigmatism. Sometimes correction of astigmatism can cause change in the apparent size and shape of objects, and it may affect the patient's judgment of distance. A patient may see taller or shorter, or walls may appear to slope and floors curve.

In most cases, adjustment to these side effects takes only a week or so. Astigmatism correction may involve a compromise between optimal clarity and visual discomfort.

4. Presbyopia

Presbyopia is an age-associated progressive loss of the focusing power of the lens. This results in difficulty seeing objects close-up.

The focusing power of the eye, which depends upon the inherent elasticity of the lens, is gradually lost as people age. This results in a slow decrease in the ability of the eye to focus on objects nearby.

People usually notice the condition around the age of 40, when they need to hold reading materials further away in order to focus. Presbyopia is a natural part of the aging process and affects everyone.

Symptoms

- Decreased focusing ability for near objects
- Eyestrain
- Headache

A general eye examination will be performed, including measurements to determine a prescription for glasses or contact lenses.

Relevant tests

- Visual acuity test
- Refraction test
- Muscle balance test
- Slit lamp examination
- Retinal examination

Treatment

Presbyopia can be corrected with glasses or contact lenses. In some cases, the addition of bifocals to an existing prescription is sufficient. As the ability to focus close-up worsens, the prescription needs to be changed accordingly. Around the age of 65, the eyes have usually lost most of the elasticity needed to focus close up. However, it will still be possible to read with the help of the appropriate prescription. Even so, it may be necessary to hold reading materials further away, and larger print and more light become necessary. People who do not need glasses for distance vision may only need half glasses or reading glasses.

With the use of contact lenses, some people choose to correct one eye for near and one eye for far. This is called monovision and eliminates the need for bifocals or reading glasses, but can interfere with depth perception.

New surgical procedures can also provide solutions for those who do not want to wear glasses or contact lenses.

Ocular motility and strabismus

Anatomy of the extraocular muscles

There are six extraocular muscles which rotate the eye about its vertical, horizontal, and antero-posterior axes: the Medial Rectus (MR), the Lateral Rectus (LR), the Superior Rectus (SR), the Inferior Rectus (IR), the Superior Oblique (SO), and the Inferior Oblique (IO).

Muscle movements

A given extraocular muscle moves an eye in a specific manner, as follows:

- MR - moves the eye toward the nose
- LR - moves the eye away from the nose
- SR - primarily moves the eye upward and secondarily rotates the top of the eye toward the nose
- IR - primarily moves the eye downward and secondarily rotates the top of the eye away from the nose
- SO - primarily rotates the top of the eye toward the nose and secondarily moves the eye downward
- IO - primarily rotates the top of the eye away from the nose and secondarily moves the eye upward

The primary muscle that moves an eye in a given direction is known as the "agonist." A muscle in the same eye that moves the eye in the same direction as the agonist is known as a "synergist", while the muscle in the same eye that moves the eye in the opposite direction of the agonist is the "antagonist". According to Sherrington's law, increased innervation to any agonist muscle is accompanied by a corresponding decrease in innervation to its antagonist muscle(s).

Muscle innervations

Each extraocular muscle is innervated by a specific Cranial Nerve (CN)

MR - cranial nerve III

LR - cranial nerve VI

SR - cranial nerve III

IR - cranial nerve III

SO - cranial nerve IV

IO - cranial nerve III

The following can be used to remember the cranial nerve innervations of the six extraocular muscles: LR6(SO4)3:

That is, the LR is innervated by CN6, the SO is innervated by CN4, and the remaining muscles (MR, SR, IR, and IO) are innervated by CN3.

Cardinal positions of gaze

These are six positions of gaze which allow comparisons of the horizontal, vertical, and diagonal ocular movements produced by the six extraocular muscles. These are called the six cardinal positions:

- up/right
- right
- down/right
- down/left
- left
- up/left

In each position of gaze, one muscle of each eye is the primary mover of that eye and is yoked to the primary mover of the other eye. Below, each of the six cardinal positions of gaze is shown, along with upward gaze, downward gaze, and convergence. (Fig. 3.6)

Fig. 3.6

Strabismus (heterotropia)

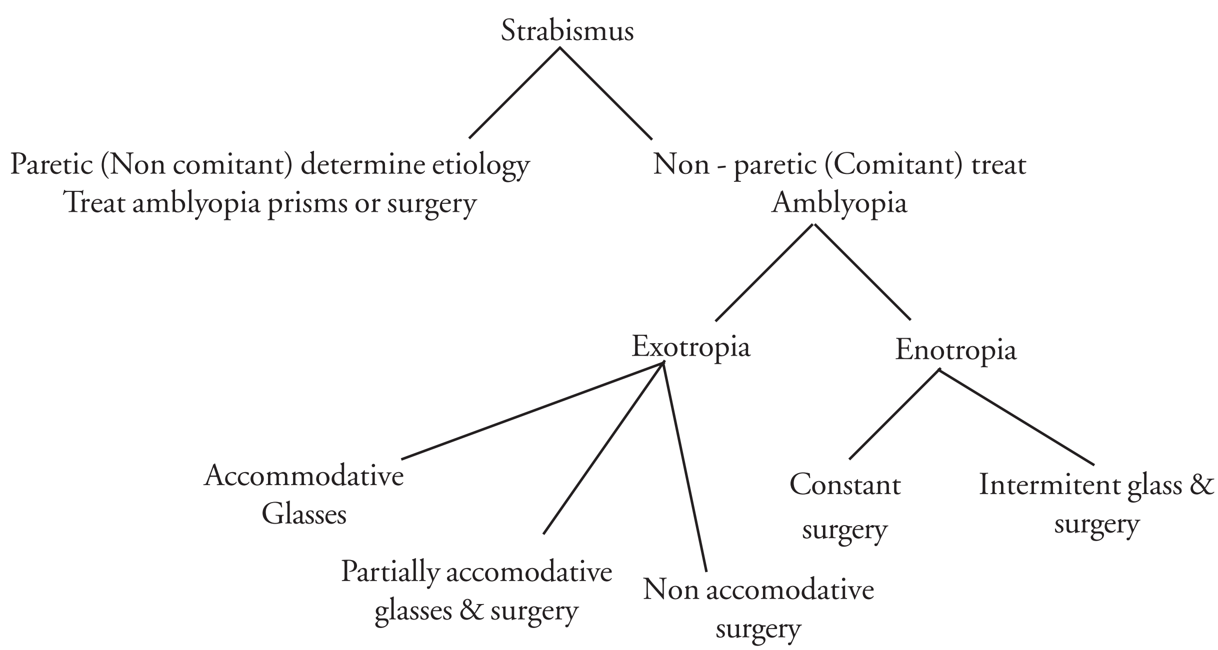
Normally, when viewing an object, the “lines of sight” of both eyes intersect at the object; that is, both eyes point directly at the object being viewed. An image of the object is focused upon the macula of each eye, and the brain merges the two retinal images into one. Sometimes, however, due to some type of extraocular muscle imbalance, one eye is not aligned with the other eye

Types of squint

The classification of Strabismus may be based on a number of features, including the relative position of the eyes, whether the deviation is latent or manifest, intermittent or constant, concomitant or otherwise and according to the age of onset and the relevance of any associated refractive error. The type of strabismus is established by a detailed history and orthoptic examination

- Infantile esotropia (syn: congenital or essential esotropia) is an idiopathic syndrome in which an esodeviation is present before the age of six months. It is invariably associated with other clinical features including dissociated vertical deviation, inferior oblique overaction, latent nystagmus, crossed fixation, asymmetrical monocular optokinetic responses (OKN) and, usually, no refractive error
- Acquired strabismus includes fully and partially accommodative refractive esotropia, convergence excess esotropia, cyclic esotropia, occlusion esotropia and various forms of paretic squint
- Exotropia may also occur in congenital and acquired forms, both concomitant and incomitant
- Vertical strabismus includes dissociated deviations, cyclovertical muscle anomalies and restrictive conditions (e.g., Brown’s syndrome) as well as rarities such as double elevator palsy

Types of deviations and the management



These broad categories of strabismus are distinguished by having various aetiologies and usually differ in prognosis, with and without treatment.

Strabismus management

1. Infantile esotropia

There are five broad considerations in planning management of infantile esotropia:

Development of binocular vision

Children with untreated infantile esotropia, when assessed at school age, will commonly show equal visual acuity and a dense alternating suppression with no form of demonstrable binocular cooperation. Early surgery is advocated on the basis that the primary defect is a motor one and alignment of the eyes before some critical age might permit the development of binocular function. This is the most controversial issue in the management of the condition and has the greatest influence on the timing of any surgery. As yet, there is not enough evidence to decide the matter and contrasting policies are followed by different surgeons.

To illustrate the variety of results that have been obtained, three studies have been selected:

(i) In a widely cited study that stimulated further work on early surgery, 93% of 106 children operated upon and successfully aligned before the age of two years, had worth 4-dot fusion or gross stereopsis. Of the children aligned after this age, 31% demonstrated a similar outcome.

(ii) In a series of 358 patients who had undergone surgery for infantile esotropia, 20% were orthotropic with fusional amplitudes and normal retinal correspondence. None had stereopsis with TNO test and only three had low-grade stereopsis on the titmus test. The probability of achieving subnormal binocular vision appeared to decrease with increasing age at surgery and was consistent with the view that surgery before the age of two produces better results but these may still be obtained in patients at a later age.

(iii) In a recent prospective study of 98 out of 118 patients who underwent surgery for infantile esotropia, and who had remained aligned to within 8 PD of straight five years later, one third had stereopsis on the titmus test (range 200-3000 seconds of arc). Thus 22% of the original group had obtained some form of binocular function and 68% had remained well aligned. No patient with a divergent squint of any degree demonstrated stereopsis.

In attempts to improve results, other studies have aimed for alignment by 12 or even 6 months of age, but no better stereopsis has been achieved.

The most common outcome of successful surgery is the monofixation syndrome with subnormal binocular vision. The surgical target in infantile esotropia is, therefore, usually within 10 PD of straight, this being the maximum angle at which monofixation is possible.

The advantages cited for various forms of subnormal binocular vision over complete suppression are: simultaneous binocular perception, fusional vergence, intact binocular field, normal distance judgement and, sometimes, gross stereopsis. An advantage to later surgery is a lower risk of subsequent amblyopia.

As an alternative to surgery, botulinum toxin injection into the medial recti has been reported but is not at present in general use.

Correction of amblyopia

While many children with infantile esotropia demonstrate balanced alternating fixation, amblyopia may occur. In untreated squint this is reported as between 13% and 33%, rising to 20-80% after surgery. It is therefore important to monitor infants following squint surgery and to treat any amblyopia detected.

Provided that suitable orthoptic supervision is carried out, it is not necessary to delay surgery until completion of amblyopia therapy.

General health issues

Systemic disorders which increase the risks of anaesthesia should be regarded as a relative contraindication to early surgery. The angle and direction of squint in infants with cerebral palsy and other neurological disorders is often unstable. In such patients surgery for presumed infantile esotropia may be better deferred at least until two years of age. However, in a prospective study of surgery for essential esotropia, the outcome was no worse in the neurologically impaired or premature infants.

Surgical treatment

The definition of satisfactory cosmetics and the optimum age for surgery in a given case are a matter for discussion between the parents, orthoptist and surgeon. As regards to the type of surgery, published evidence suggests that bi-medial rectus recession is the most effective procedure, perhaps combined with simultaneous resection of one lateral rectus for large angle squint.

The type and amount of surgery to perform for a particular squint is a decision for the experienced surgeon. Parents need to be advised that, whilst accuracy in measuring and operating upon Strabismus is essential, the response to surgery is variable and cannot be guaranteed. It is good practice to agree on the objectives and discuss the actions necessary if the desired surgical outcome is not achieved.

Correction of associated features

Correction of overacting inferior oblique muscles found in association with 'V' pattern strabismus may be required on cosmetic grounds, including a compensatory abnormal head posture and, if marked, is usually carried out at the same time as the esotropia surgery. If binocular function is present after surgery, persistent inferior oblique overaction may disrupt it.

In summary, there is no series of cases reported in which successful alignment in infantile esotropia has allowed the development of high grade stereopsis associated with bi-foveal fixation (40 seconds of arc or better). If the eyes are aligned to within 10 PD of orthotropia, up to one third of patients develop subnormal binocular vision. There is evidence to suggest that this binocular vision provides functional advantages. However, there are no accurate means of predicting preoperatively which patients will enjoy this outcome.

2. Acquired strabismus in early childhood

General principles

Most of the preceding recommendations in infantile strabismus management also apply in acquired strabismus.

The important differences are

- An assumed history of possible normal binocular vision prior to the onset of squint.
- A greater likelihood that optical treatment alone will be required.
- The related risk of loss of binocular vision if treatment for the squint is delayed.

In view of these factors, treatment should aim to restore ocular alignment and binocular vision as soon as possible. It is therefore necessary to consider whether a given case of childhood strabismus has a chance of a good functional result following therapy on the basis of the history, with particular regard, to age, and findings such as the presence and severity of any associated amblyopia and / or suppression. It may also be necessary to inform general practitioners that delay in the referral of young children with strabismus serves no useful purpose. Information regarding the mode (i.e., constant or intermittent) and time of onset of a squint is helpful in assigning appropriate urgency to appointments.

Management sequence

It is important to measure and fully correct significant refractive error before planning any surgical correction of strabismus. It is also desirable to have corrected any amblyopia present.

Pre-operative prism adaptation in acquired strabismus

There is good evidence to show an improved predictability and outcome of surgery in acquired esotropia following adaptation using Fresnel prisms on spectacles. Briefly, the method is used to discover patients with fusion potential and may disclose a larger angle of squint than that first measured. Surgery carried out on this larger angle has a greater chance of success without an increased risk of over-correction, and prism-responders so treated are less likely to require re-operation. This technique is recommended where practicable, particularly if measurements of squint angle are variable.

3. Exotropia

Exotropia may be constant or intermittent and may present as a primary condition or be consecutive (following esotropia) or secondary to unilateral visual loss.

Constant primary exotropia is much less common in this country than esotropia. It is thought to be more commonly associated with other developmental abnormalities. The deviation is usually large with alternating fixation and a low risk of amblyopia and the squint is present on near and distance fixation even when accommodation is stimulated.

In contrast, intermittent exotropia, which may begin in infancy, is noted when one eye drifts outward at times, particularly in bright conditions, on distance fixation and when the patient is tired or unwell. When the deviation is manifest there may be suppression or diplopia, typically overcome by closing one eye. Intermittent exotropia may be found to measure the same angle at near and distance. More commonly, the eyes are straight at near and divergent in distant and far distant fixation. In convergence weakness, the angle is larger on near fixation. Children who have straight eyes on near testing demonstrate good stereopsis (60 seconds of arc or better) when old enough to perform detailed tests.

Treatment aims are generally the same as for esotropia, namely eradication of amblyopia, restoration of fusion where possible and re-alignment where necessary to achieve satisfactory function and appearance.

Orthoptic treatment is useful in improving control of residual intermittent exotropia in children with good fusion who are old enough to learn how to be aware of the deviation of one eye. Training is then aimed at improving fusional amplitudes.

4. Vertical strabismus

The two most common causes of vertical strabismus in childhood are superior oblique under actions and dissociated vertical deviations.

Superior oblique weakness may be due to paresis or to maldevelopment of the muscle tendon. Typically, hypertropia in the affected eye will be associated with a compensatory head tilt to the opposite side with chin depression and overaction of the ipsilateral inferior oblique. The head posture develops as soon as the infant gains head control when upright. It may not be noticed by the family and photographs are useful evidence. There is usually evidence of fusion in the presence of the head posture in primary gaze. Fusion is prevented if the hyperdeviation or cyclodeviation is large.

The aim of surgery is to allow normal binocular fusion in primary gaze and on looking down without abnormal head posture.

Strabismic amblyopia is detected by the use of suitable tests performed on children who have presented with manifest squint. Anisometropic amblyopia is usually discovered when a child presents having failed a screening test of visual acuity.

Amblyopia may be of mixed etiology; e.g., children with anisometropic amblyopia may present with strabismus, and unilateral cataract may lead to secondary squint in which the amblyopia is likely to be severe.

The minimum criterion for diagnosing amblyopia on a test of visual acuity is accepted to be two lines difference between the eyes on the linear Snellen test. This is usually equivalent to a difference of one octave in spatial frequency resolution. On repeated testing it may be possible to detect amblyopia in an eye with visual acuity of 6/9 when the fellow eye sees 6/6 (i.e., one line difference).

Vigilance against strabismus

Intermittent deviation of the eyes is a quite common finding in healthy neonates and should not cause undue concern. Normal binocular co-ordination becomes evident at about three months and strabismus after this age is significant.

Constant squint is generally recognised early by the family, health visitor or general practitioner. A positive family history of squint or amblyopia should alert those in primary care when carrying out routine checks or immunisations.

Strabismus is often found in association with neurological disease such as in cerebral palsy and in craniofacial developmental anomalies.

Strabismus, amblyopia and refractive error are much more common in children with treated or regressed retinopathy of prematurely (ROP). Premature infants with a history of stage III ROP or worse should be followed up after the neonatal period to screen for these complications.

If squint or amblyopia is suspected in the primary care setting, it is appropriate to provide for direct referral to an optometrist or an orthoptist to exclude refractive error and strabismus. If no abnormality is detected, such patients may be discharged. Cases with intermittent or constant manifest squint should be referred to an ophthalmologist without delay. In all children referred with Strabismus or amblyopia the possibility must be considered that this is the presenting feature of a serious ophthalmic or systemic disease requiring urgent management.

There are many aspects of strabismus and amblyopia management which require audit from time to time in order to be sure of the quality and efficacy of care provided. Audit requires clear objectives and adequate resources in order to be carried out successfully.

In order to audit the results of treatment in strabismus, reference should be made to the aims of treatment which are:

- Optimum visual acuity in each eye
- Optimum binocular function
- Good cosmetic appearance

The first two aims may be quantified on examination, while the third requires questions to be asked of the patient and parents, although alignment of the eyes to within 10 prism dioptres of straight is usually compatible with an acceptable appearance and with peripheral fusion.

Suggested data to be assessed in audit

i) Status
    a) At presentation
    b) During and after amblyopic treatment
    c) Preoperative
    d) Postoperative
    e) On discharge

ii) Patient variables
    a) Age
    b) Visual acuity
    c) Refraction/prescription
    d) Diagnostic category
    e) Associated diagnoses
    f) Strabismus angle
    g) Surgery
        - Target angle
        - Technique
        - Complications

iii) Event
    a) Out-patient appointment
    b) Out-patient attendance
    c) Under-correction
    d) Over-correction
    e) Re-operation

Visual field

The visual field is the total area where objects can be seen in the peripheral vision while the eye is focused on a central point.

Visual field parameters

The normal visual field extends from the point of fixation to about 60 degrees nasally and superiorly, 70-75 degrees inferiorly and 90-95 degrees temporally. Visual field tests are used to discover any abnormalities in the retina and visual pathways in the orbit and brain.

Glaucoma is one of the most common conditions tested by perimetry in ophthalmology and gives the doctor a basic starting point of treatment to prevent further field loss.

When field abnormalities are found, they are analysed by their shape, placement and extent.

Terminology commonly used in perimetry

1. Hill or peak is the area wherein the retina's potential to respond to a target (a light or a white object against a black background or any other stimulus) is the most sensitive area to yield a response.

2. Isopter is the boundary of a number of points that are connected to form a visual pattern of perception that has been determined with the same size test object. It is found by starting a moving test object in from the nonseeing periphery to a point where the test object is first seen by the patient and this is tested in all twelve meridians and the points of perception are connected.

3. Scotoma is a blind area where the patient cannot see a test object. It is an abnormal blind spot that is surrounded by a seeing visual field. Each scotoma is evaluated with different sized test objects first seen by the patient and this is tested in all twelve meridians and the points of perception are connected.

4. Para indicates a nearness to something, such as the center or macula which would be termed paracentral or paramacular. Example: Paracentral scotoma.

5. Peri indicates that a scotoma can be around something, such as peripapillary which means around the disc. Below are some common perimetry definitions:

a) Horizontal meridian - horizontal line through fixation which divides superior and inferior visual fields.

b) Vertical meridian - vertical line through fixation which divides left and right visual field.

c) Absolute - no recordable vision within a scotoma

d) Acurate or bjerrum scotoma - Arching visual field defect within the area between 10 to 25 degrees in the superior and inferior field.

e) Central scotoma - defect involving fixation.

f) Caeco-central scotoma - defect encompassing the physiologic blind spot and fixation.

g) Split fixation - defects close to but not involving fixation.

h) Altitudinal - complete loss of either the superior or inferior field from the nasal to the physiologic blind spot

i) Hemianopic / Hemianopsia - defect respecting the vertical meridian.

j) Quadranopic / Quandranopsia - defect of the vertical meridian, involving only one quadrant.

k) Homonymous - defect occupies the same side of visual space in both eyes. Defect is named for the side which is abnormal.

l) Congruous - Bilateral hemianopic defects which are essentially identical; the fields can be superimposed on one another. Congruity indicates a posterior lesion location.

m) Incongruous - Heminopic defects which are not identical incongruity indicate an anterior lesion location.

6. Rods are cells in the retina, mainly located in the midzone of the retina (30 degrees to 60 degrees). There are 138 million rods distributed in the retina outside the macula, they respond to low light better than cones and do not perceive fine detail or distinct colour. Night blindness is the common symptom of field defects in this region.

7. Cones are cells found mostly in the macula and are capable of the best visual acuity and colour discrimination. There are six million cones in the macula. The center of the macula, the fovea, is made up of only cones and is the central fixation point for the visual field test.

8. The optic disc causes the normal blind spot because it has no retinal receptors. The disc is located on the nasal side of the macula. It is also referred to as the optic nerve head. Afflictions to the optic nerve from vascular problems, tumour, trauma, infection or inflammation create field defects which are monocular and point to the disc. In other words vision can be completely gone in the eye in which the optic nerve is affected.

9. The left half of both visual fields is produced by the retinal receptors in the right eyes' temporal retina and the left eyes' nasal retina. The opposite is true of the right half of the visual field.

10. Chiasma is the part of the visual pathway to the brain where the pathway crosses each other. If there is a disease in the chiasma, the vision of both eyes can be affected either both temporally or both nasally.

11. Optic Radiation is part of the visual pathway to the brain. Diseases affecting this part can cause loss of quarter field of vision (Quadrantanopia).

12. Cortex: If there is a disease adjacent to the visual Cortex, half of the vision (temporally and nasally, just sparing the macula), can be lost.

The visual pathway and typical patterns of visual field loss. (Fig. 3.6).

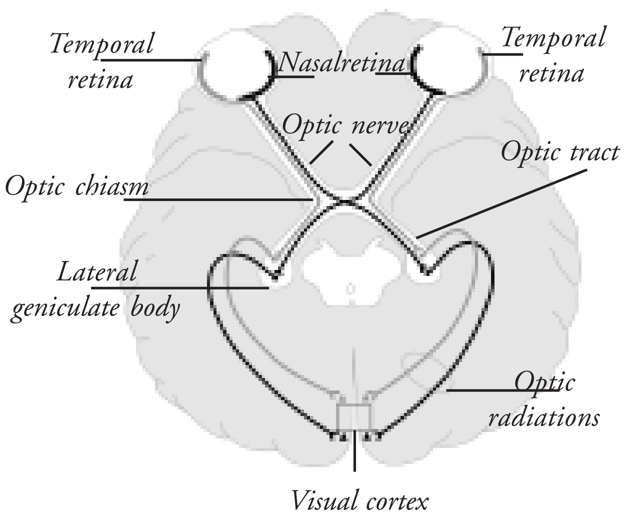


Fig. 3.6

These 2 diagrams illustrate how the nerve fibres are arranged to transmit information from the retina to the brain.

All the fibers leave the eye, down the optic nerve. The first diagram shows how these fibres reach the optic nerve head (the optic disc), from each part of the retina. These fibers are very sensitive to increased pressure inside the eye (which is what happens in glaucoma). In untreated glaucoma cases more and more fibre bundles are progressively damaged resulting in bjerrum scotoma. When progressively more and more bundles of nerve fibres are damaged, this produces scotomas in the visual field, typically the bjerrum scotoma usually found between 5-20 degree from fixation, and the nasal step.

The second diagram shows the pathway of the fibers from the eye to the brain. Half the numbers of fibers from each eye crosses over and join the uncrossed fibers of the opposite eye at the chiasma. This arrangement makes the right half of the brain see objects in the right half of the visual field and left side of the brain sees objects in the left half of the visual field.

The fibers transmitting images of the temporal fields must cross over, which they do at the "chiasm". So if these fibres are damaged a bitemporal hemianopia is produced. The other typical field issues in damage to the different parts of the pathway are also shown.

Nerve fiber pattern of retina in its relationship to retinal vascular tree showing the two typical nerve fiber bundle defects found in glaucoma.

Extent of a normal visual field

Normal visual field is determined by the size of the test object employed and the distance at which the test is made. With a 3mm white test object at a distance of 33mm (Radius of the perimeter) the field limit is about 90 degrees temporally, 70 degrees inferiorly, 60 degrees medially and superiorly.

The structure of the normal field is considered to be of two portions: The central field, which constitutes that portion of the visual field within the 30 degree radius of fixation, and the peripheral field which makes up the remainder.

Blind spot: The blind spot is physiological blind area which corresponds with the exit of the optic nerve. It is located about 12 to 15 degrees temporal to the fixation and about 1.5 degrees below the horizontal meridian. The normal measurement of the blind spot is approximately 5.5 degree horizontally and 7.5 degree vertically.

Isopter: The isopter is the contour lines of the visual fields and it is decided by the size of the stimulus and the distance at which it is viewed. It is expressed as a fraction (size/distance).

Visual field examination

The visual field examination measures the expanse and sensitivity of vision surrounding the direct line of sight, that is, peripheral vision. Unlike most losses of central vision, defects in peripheral vision can be subtle and are often unnoticed by a patient. Disturbances in peripheral vision are commonly due to diseases of the retina, optic nerve, or structures of the visual pathway in the brain. Early detection of these abnormalities by a visual field examination permits initiation of treatment that may halt further progression of the disease and prevent irreversible loss of central, as well as peripheral vision.

The visual field examination consists of a number of different testing procedures. Two relatively simple techniques are included in the comprehensive visual examination to obtain a gross evaluation of the patient's peripheral vision: confrontation visual field testing and Amsler grid testing. Performance of these tests is often the responsibility of the OA. The results of these two tests may indicate the need for more exact procedures of perimetry.

Confrontation field test: The confrontation field test compares the boundaries of the patient's field of vision with that of the examiner, who is presumed to have a normal field. Here is how to perform the confrontation field test:

- Seat the patient at a distance of 2 to 3 feet from you. Confront (face) the patients, cover or close your left eye, and have the patient cover the right eye. You and the patient should fixate on each other's uncovered eye.
- Extend your arm to the side at shoulder height and slowly bring two fingers from beyond your peripheral vision toward your nose into the field of vision midway between the patient and yourself. Ask the patient to state when the fingers are visible.
- Repeat the process of moving fingers into the visual field from four different directions. If you picture a clock face in front of the patient's eyes, you perform the hand movement from about 2 o'clock, 4 o'clock, 8 o'clock, and 10 o'clock, each time bringing the fingers toward the center of the clock face.
- The patient should see the fingers at the same moment you do in each of the four quadrants (upper-left, upper-right, lower-left, and lower-right quarters) of visual field. (Note: A quadrant of vision described from the patient's point of view) If the patient does not see your fingers the same time you do, the breadth of patient's visual field in that quadrant is considered to be smaller than normal and additional perimetric studies will probably to be performed.
- Record the patient's responses in the patient's chart by indicating simply that the visual field is comparable to yours or that it is reduced in any of the four quadrants for that eye.
- Repeat the procedure as described with the patient's other eye and record the results similarly.

Amsler Grid test

The Amsler grid test determines the presence and location of defects in the central portion of the visual field. The Amsler grid is a printed square of evenly spaced horizontal and vertical lines in a grid pattern, with a dot in the center. The chart grid and dot may be either white on a black background or black on a white background. Here is how to perform the Amsler Grid test.

- Have the patient hold a white-on-black test card about 16 inches away with one hand and cover one eye with the other hand, an occluder, or a patch.
- Direct the patient to stare at the center dot and to report if any portions of the grid are blurred, distorted, or absent. The patient should not move the gaze from the center dot, so that the presence of any distortion can be assessed.

- If the answer is yes, you may repeat the test with a black-on-white Amsler recording chart, on which you ask the patient to mark the location of visual difficulties.
- If test results are normal, state so in the patient's record. If abnormal, state so. Include the Amsler recording chart in patient's record. If visual disturbances noted, the patient is a likely candidate for further studies.The patient may also repeat this convenient procedure independently at home and report the changes to the ophthalmologist's office. The patient should perform the test monocularly one eye at a time, always at the same 16-inch distance and under the same illumination.

Tangent screen test

The purpose of this test is to determine the central 30 degree of the visual field. It is best performed by the use of a tangent screen. A tangent screen is usually made of black felt material. The meridians are stitched in 5 degrees interval (stitched at 10, 15, 20, 25 and 30 degrees from the point of fixation). The test is conducted at a distance of one or two meters from the eye. Test objects varying from 1mm to 50 mm are used. This is the most common visual field test. The test is simple and easy to perform. The targets are in the form of circular discs or balls of sizes which vary from 1 mm to 50 mm in diameter.

These test objects are inserted in the end of a long wand. The holder or wand should be covered with a black cloth of the same material as the screen. Painted black wands cast a considerable amount of light reflection and should be avoided because they are distracting to the patient.

The most common method of recording one's results is to insert black pins into the screen at the points indicated and then transferring these points to a chart after the examination has been completed. In some of the newer tangent screens (Bausch and Lomb), there are projection devices and a self-recorder, so that the insertion of pins is not necessary. It is desirable that when pins are inserted the distraction caused by this movement is at a minimum. With the new tangent screen, the projection of targets virtually eliminates the distraction caused by the movements of the examiner.

Perimetry: Generally Lister's perimeter or Fimonk projection perimeter is employed. An ideal perimeter would be formed by an arc of one half of a hollow sphere (with a radius of 33 cms) which could be rotated throughout the 360 degree of the fixation. The stimulus or test object would be moved from the periphery towards the fixation target with the help of the knob behind the instrument. The chin rest is placed at the center of the sphere.

Use of the Goldmann type perimeter

I. Set-up

- The instrument should be placed in a room that is completely blacked out where there is total control of illumination (the only illumination should be from the instrument itself).
- The instrument should be placed on a level table and the legs of the instrument should be adjusted so the spinite level bubble is centred.
- At the start of any clinic when the instrument is used the calibration should be checked using the light meter as follows:
  a. The illumination of the target spot should be set at 1000ive tangent shining on the light meter head placed in the slot as shown in the manual, this adjust using the rheostat on the side of the instrument.
  b. The background illumination is adjusted by sliding the housing around the lamp (at the top of the bowl) up and down - the setting should be 31.5 as indicated in the manual and is measured with the light meter now placed in the slow by the chin rest.

If at any point during the test a defect appears, it should be explored for its size, shape, and density. This is accomplished by moving the test object from a blind area into a seeing area at right angles to the border of the defect. The size and shape of this defect should be outlined at least twice in order to check the patient's reliability. The density of the field defect is determined by using a number of test objects of various sizes. If a small test object was employed when the defect was initially discovered, then a larger test objects should be used and vice versa.If the patient's responses are confusing and equivocal, it is probably because the test object is too small to be easily seen. In such a case, a larger test object should be chosen.

II. Performing perimetry using the Goldmann instrument

- After placing a chart into the holder the patient is seated at the perimeter-one eye occluded, chin on the chin rest and head against the bar the buzzer in his / her hand.
- Adjust the chin rest with the two control knobs asking the patient to look at the fixation target looking also the telescope to check the fixation - the pupil should be lined up with the cross wires.
- Peripheral fields are normally plotted with the 1.4 e target i.e. maximum brightness with 0.25 mm target. The normal dimensions are indicated on the front of the Goldmann manual.
- If there is any field (central 30 degree) the patients prescription should be placed in the lens holder- using full aperture lenses. It should be the prescription they normally use for reading. 1.4 e target should be used.
- The technique for checking the field is the same as for tangent screen and Lister perimeter.

The advantages of this method are

i) Totally controlled and even illumination for background tangent.

ii) Using the knob on your right for presenting the target you can either have the target constantly displayed and when you push down on it, it disappears or the way it is normally used. If you use the knob through 180 degree the target will be suited off and only presented when you press the knob down, you can then make the target disappear at will to check the patient's response.

iii) As more accurate and repeatable fields can be plotted with the instrument it should be used whenever you wish to have a full visual fields exam carried out and whenever you wish to monitor a changing field.

III. Automated perimetry

Automated perimetry was developed to standardise visual field testing and therefore to increase the reliability of visual field tests. Various manufacturers make automated perimeters based upon computerised projection systems and LED (Liquid Crystal Display) systems. Automated perimeters can perform screening and diagnostic field tests and can use kinetic and static methods. These perimeters are most often used for static threshold testing.

The most widely used automated perimeter is the Humphrey field analyser, which has become the standard for visual field testing.

Visual field pathologies

Field defects: Fields are classified as those which encroach from the periphery of the field, and those which originate within the confines of the margins of the field itself.

Scotomate

A Scotoma is an area of partial or complete blindness within the confines of a normal or relatively normal visual field. Within a scotoma, the vision is more depressed than in the area of visual field surrounding it. When the depressed area of scotoma expands into the periphery of the field, it is said to have "broken through". Scotoma may be divided into the following types:

- Central scotoma, which involves the fixation area and is always associated with a loss of visual acuity.
- Pericentral scotoma (annular scotoma), when the fixation area is relatively clear and the field immediately surrounding it is deficient.
- Paracentral scotoma, when the area of depressed visual field is to one side of fixation. These scotomate may also be denoted as to their position, whether they are nasal or temporal in relation to the fixation point.
- Cecal scotoma, when the area of the normal blind spot is involved.
- The nerve fiber bundle scotoma, also referred to as an acurate, Bjerrum, or comet type of scotoma. This type of depression extends around the

fixation point from the blind spot in an arched fashion and ends typically on the nasal side of the field with a sharply demarcated border. This type of scotoma can occur either above or below the blind spot but seems to issue from it.

The intensity of a scotoma varies from absolute blindness to a minimum detectable loss of visual acuity. If there is complete blindness to all sizes of test objects, it is an absolute scotoma. If the area involved is definitely out only to smaller test objects and larger test objects can be seen, then it is referred to as a relative scotoma.

Contraction of the visual field

Contraction usually occurs as an area of blindness emanating from the periphery of the field and extending towards the center. If the contraction affects only one part of the field, it is often referred to as a sector defect. Sector defects bounded by vertical or horizontal diameters of the field are hemianopic defects. The term hemianopic is used to indicate a defect occupying half of the visual field and which is, usually, a bilateral defect. A hemianopic defect is homonymous right or left, when the corresponding halves of both eyes are affected. In this instance there is blindness in the temporal field of one eye and in the nasal field of the other eye. The dividing line between the seeing and the non-seeing portions of the field is vertical.

When a quadrant of each field is affected, a quadrantanopia is present. A defect or loss of the upper or lower half fields is termed as altitudinal hemianopia. A bi-temporal hemianonia is a visual field defect that may vary from the slightest depression of the upper temporal portion of the field to complete blindness in each temporal field.

A congruous homonymous hemianopic defect is one in which the defects in the two fields are super imposable, i.e., completely in this instance, when one maps the visual field of one eye, its margin will be identical to the visual field of the other eye.

Common testing methods

- Confrontation
- Tangent screen
- Goldmann perimetry
- Automated (Humphrey, Octopus, Dicon, Topcon)
- Amsler grid

Low vision aids

Low vision has been a subject of continued neglect by ophthalmologists for various reasons. In reality it is only the willingness of professionals to take up the low vision field that would prevent avoidable blindness.

The difficulty in availability, accessibility, and the high cost of low vision devices, are problems in this field. If a large number of ophthalmic professionals are involved in this field, these problems could be rectified. The global initiative for elimination of avoidable blindness includes low vision as an important cause.

The strategies are

1. To develop and make low vision services available and optical devices available for all those in need, including children in blind schools, and integrate their education.
2. To include provision of comprehensive low vision care as an integral part of national programmes.

When conventional spectacles can no longer help and surgery or medical treatment is not appropriate, it is time to consider low vision aids. Low vision aids are magnifying devices in a wide array of strengths and designs to enhance the functional vision for poorly sighted persons. They range from simple hand-held lenses.

Low vision aids are classified into conventional lenses and magnifying devices. Different ones are required for different visual tasks. They do not enable everything to be seen clearly and easily. Low vision devices are determined depending upon the patient's existing visual acuity, age and occupation for which the optical aid is designed. For viewing distant objects, telescopes or binoculars sometimes can be helpful. The patient often will have to try two or three aids before deciding on the appropriate one.

Definition

The World Health Organization defines - "A person with low vision is one who has impairment of visual functioning even after treatment, surgery or standard refractive correction and has a visual acuity that range from less than 6/18 to light perception or a visual field of <10 degrees from the point of fixation, in the better eye but who is potentially able to use vision for the planning and or execution of a task".

Optics of low vision aids

LVA function by presenting the patient with a magnified view of the object. It increases the visual angle subtended by an object at the eye thus producing an enlarged retinal image. The basic principle of most of the optical devices is to provide magnification, spreading the image over a greater area of the retina to incorporate a larger number of functioning receptors.

Classification of low vision aids

Optical aids

- Telescopes
- Ashperic lenticular spectacle lenses
- Hand magnifier
- Stand magnifier
- Fresnel prism
- Prismospheres
- Paper weight magnifier
- Bar magnifier
- Pocket magnifier
- Electronic aids as closed circuit television system

Non optical aids

- Large - print books
- Reading stand that supports posture and comfort
- Illumination devices such as fluorescent lamps and glare control devices such as photochromatic glasses
- Writing devices such as typoscopes
- Medical management devices such as insulin syringes with bold letters
- Mobility canes
- Sensory substitution devices such as talking books

Ocular conditions benefited by low vision aids

- Albinism
- Central serous retinopathy
- High myopia
- Microphthalmos
- Diabetic retinopathy

Ocular conditions where there is not much benefit from low vision aids <2/60 and field of vision is <10 degrees.

- Retinitis pigmentosa
- Advanced glaucoma
- Optic atrophy with field defects
- Retinal vascular occlusion
- Macular dystrophy

Low vision evaluation

Evaluation of a low vision patient begins with assessment of the clinical background, functional assessment, vocation, independence in daily living activities, mobility, social interaction, psychological reaction, reading and writing performance with patient's stated needs. It is more important to evaluate the patient as a whole. Just recording the complaints and examination will not help to support the patient.

The optometric evaluation includes vision examination using a 1 meter or 3 meter chart. The patient has to be seated at a specific distance. The chart has a geometric progression of letters with lines equivalent to the standard snellen visual acuity chart. This chart has logarithmic units and the dioptric add on the right side and letter size in "M" units on the left side. This is the Logarithmic visual acuity chart 2000 by the precision vision company. This chart is very useful in evaluation of the low vision patient. The refraction is done at one-meter distance, using retinoscopy. Bracketing method can be used subjectively to arrive at a proper refractive correction. A majority of low vision patients will benefit from LVA for near vision. All that is required is motivation to use a low vision device and the need to use it professionally. The following formulas are useful in the day today low vision practice:

- The "Kesten Baum Rule" is the reciprocal of the distant Snellen visual acuity; e.g. if the distant Snellen visual acuity is 6/60 then the reciprocal will be 60/6 = 10D. A patient will require 10 D add for near vision.

- The Brazelton formula: Magnification = Best corrected distant visual acuity x 2.5x.
- Lighthouse method: The lighthouse near visual acuity card can be used at 40cm test distance requiring an add of + 2.50 D. The add can be increased depending on test distance even up to 10cm. The chart gives the letter size in 'M' units on the left side and diopteric adds on right side.

The Halberg trial clips make refraction quicker, more convenient and accurate. The errors arising out of vertex distance, pantascopic tilt, are eliminated. The optometric evaluation also includes visual fields examination using amsler grid, central and peripheral fields. If the scotoma recorded in amsler grid is more than 30 degrees from fixation then the use of a magnifying spectacle is guarded. The central and peripheral fields are documented. If the fields are constricted more than 10 degrees then the use of a telescope may not help the patient. Contrast sensitivity is recorded to help in the functional vision testing of a low vision patient. Having gathered all the information, a trial of low vision devices is given with telescopes for distance and the hand or stand magnifier for the near work. The required illumination, glare control devices, contrast requirement are also explained to the patient. In the following description, specific low vision management pertaining to different ocular conditions is discussed.

Eccentric viewing

A common difficulty when trying to read with a magnifier is that some parts of a word can be seen and some parts can not be seen. With this particular problem, which anyone with central vision loss due to maculopathy may well experience, people often discover that they can see the whole word if they look above it rather than directly at it. This is known as eccentric fixation.

Therefore, in order to read, it is necessary to hold the eye steady (steady eye technique) with the gaze firmly fixed above the line to be read. Thus it is no longer possible to read in the ordinary way, with the print held steady and the eyes moving quickly along the line, taking in whole words and phrases. Using eccentric fixation, the line of print must be moved, not the eye. Reading by this technique is much slower than by traditional methods, particularly at first as it goes against a lifetime's experience. It can be tiring and frustrating, but at least it does enable reading. Eccentric viewing methods can also be used for activities other than reading. This is comparatively simple to do when trying to see objects. Most people with maculopathy, for example, soon find that to see the clock on the mantelpiece they need to look at from the sides, or to look down towards the fireplace or up towards the ceiling. Relatives and friends can help by making sure, for example, that a cup of tea is placed on the "good side" rather than immediately ahead.

Scanning

People with a very narrow field of vision, perhaps because they suffer from advanced glaucoma, need to move both their eyes and their head in order to read, for example, a notice pinned up on a wall. Anything printed in columns, such as a newspaper, will be easier to read because the need for scanning will be reduced. When reading longer lines it may be better to move the print across the line of vision in order to read it.

Keeping to the line and finding the next line can present problems when scanning. A finger on the line or a ruler underneath it can help. Many people are helped by using a typoscope, a matte-black thick card with a window cut out the width of the line. This can be homemade or purchased from the Partially sighted society.

When the right side field is lost, as may happen after a stroke, reading can be extremely difficult as the eye is scanning into nothingness/nothing. Loss of the field on the left side is not so incapacitating, though there may be problems in finding the next line. A bright red vertical line drawn down the page margin may help. It would need to be drawn on the side of the visual loss. For someone with a right field loss, the line denotes how far it is necessary to complete one line of reading. If the field loss is on the left, it shows the starting point of the line.

Another method is to place a bright bookmark along the left-hand edge of the print, so that the reader can turn his head at the end of each line until the bookmark is seen. Typoscopes may also help, by keeping the eye on the line and limiting the number of words that can be seen. This reduces the amount of information the brain has to sort out.

Monocular vision

A large number of people lose sight in one eye by accident, injury or disease. No one knows the exact statistics. People who have lost the sight of their right eye will have a blind spot to the left of center, and vice versa. Looking at a page containing a cross and a circle spaced three inches apart demonstrates this.

Someone who has lost the sight of their right eye should look at the cross from a distance of about 15 centimeters, and then move the page slowly further away, and then bring it closer. The spot will disappear and then reappear. Someone who has lost sight in the left eye should first turn the page upside down (but still look at the cross) before trying this experiment. People with sight in both eyes can compare what happens if they do this with either eyes open or one eye shut. Anyone with normal vision in the remaining eye is not entitled to be registered as partially sighted, though it may well take them some time to adjust to coping with monocular vision. This is because they lose part of their field of view, and initially at least they will have problems with depth perception.

It is possible to relearn how to see in depth. Nick Rumney, an optometrist who only has vision in one eye, suggests a useful exercise. Pour coloured water into a clear glass, and ask a friend to keep moving the glass so that the distance required pouring into it accurately varies. The safest way to pour is not from a height, but to let the bottle or jug touch the edge of the glass. To learn to judge the distance between objects, move the head from side to side. The objects will appear to “move” in relation to each other. The distance they appear to move apart can then be used to gauge the actual distance.

Eventually the remaining eye adjusts to its new role, though there is nothing that can be done to compensate optically for the lost field of view. People need to learn to turn their head more, and when driving make more use of their wing mirrors. People with one eye can hold an ordinary driving license, though they must inform the DVLA and their insurance company of their condition. They are not allowed to hold a professional driving license as needed for public service or heavy goods vehicles. As with other visual impairments, the best support and advice is likely to come from someone else in the same situation. "A Singular View - The Art of Seeing With One Eye" was originally written by Frank Brady, an American engineer who lost an eye as a result of a flying accident. The English edition is edited by Ron Hearnden, a Canadian businessman who lost an eye in asking accident. Nick Rumney, who lost the sight in one eye as a schoolboy, recalls that the most constructive help he received was from a teacher who only had one eye.

Here are some tips that can help people with only one eye

- When putting a drink down, place the other hand on the table and put the glass down next to it.
- It can be very difficult to judge the last step on a staircase. It may merge into the floor, especially in poor light or when the stair and floor carpets are the same. Move cautiously, feel ahead with your foot, and keep a hand on the banister.
- Wear protective spectacles at all times, especially when gardening. Polycarbonate lenses are the safest.
- When going out for a meal with a friend, make sure that he or she sits on your seeing side, but remember that the waiter may turn up on the blind side.
- In the early days, stop at a kerb to gauge the depth before crossing the road.
- If you are afraid that you may “miss” the outstretched hand when a friend greets you, put yours out first!

Points to remember

Whenever approaching the low vision patient, the optometrist should consider the following points to provide the best of devices depending upon their visual needs:

- *Possible wider field of view*
- *Light weight for easy-handling*
- *Minimised or no aberrations with great light transmission*
- *Ability to focus*
- *Appropriate magnification*
- *Compactness*

Low vision devices usually help the patient to enhance the functional vision with

- *Good illumination for close work*
- *Moving closer to objects to see better*
- *Using objects with high contrast*
- *Allowing enough time for looking*
- *Adequate training / practice to learn to use.*

The basic principle is to use the simplest device that will satisfy the specific visual needs of the patient. Low vision aids helps only to enhance the impaired vision, not to improve or restore vision. Even a small improvement by means of low vision aids often can help the patients, allowing a greater chance for education and employment.

Summary

This unit teaches the trainee the common refractive errors and how the tests are conducted with different equipment and instruments. Steps to be followed in conducting the visual field tests are also given in detail. Details about the different types of squint and the treatment to be given to the patients will help the trainee in guiding the patients. The aids that could be used by patients with low vision are also listed for the trainees. Here are some key points to remember:

- *Myopic patients will have blurred vision of the objects at a distance*
- *Hypermetropic patients will have difficulty in seeing objects which are near by*
- *There are two types of Astigmatism: regular and irregular Astigmatism*
- *There are six extraocular muscles which act to rotate the eye about its vertical, horizontal and antero-posterior axes*
- *The visual field is the total area where objects can be seen in the peripheral vision while the eye is focused on a central point*

Student exercise

I. Fill in the blanks

1. *Myopia is corrected by ………………lens.*
2. *Astigmatism is corrected by …………….lens.*
3. *The near vision is recorded at a distance of………*
4. *Hypermetropia could be corrected by using…..lens.*
5. *Symptoms of astigmatic patients are……………*
6. *Visual acuity is measured with the help of…chart.*
7. *......………… is the normal distance maintained for vision assessment.*
8. *………………………… is a non optical aid.*
9. *Humphrey perimeter is used to measure……...*
10. *Normal field of vision extends on the temporal side to…………………*

II. True/False

1. *Prism lens is used to correct squint.*
2. *Vision test is done at 3 mts distance.*
3. *Plastic lenses are highly recommended for low vision patients.*
4. *Myopia should be fully corrected in the exotropic patient.*
5. *All hypometric patients should be checked with cycloplegic refraction.*
6. *Myopic shift occurs in Keratoconus.*
7. *Myopic patients are corrected with contact lens only.*
8. *Presbyopia is not a refractive error.*
9. *Peripheral fields are recorded at Bjerrum screen.*
10. *Head tilted to one side is one of the symptoms of Astigmatism.*

III. Answer the following

1. *What is Myopia?*
2. *What is Hypermetropia?*
3. *What are the types of Strabismus?*
4. *What are the types of Myopia?*
5. *What are the types of Astigmatism?*
6. *What is meant by Squint?*
7. *Mention the normal limits of fields.*
8. *What are the devices of Low Vision Aids?*
9. *What are the different types of fields?*
10. *Name the extraocular muscles.*

CHAPTER 4 ASSISTING IN OUT-PATIENT PROCEDURES

CONTENTS

Assisting in slit lamp examination
Assisting in gonioscopy
Assisting in applanation tonometry
Assisting in fluorescein staining
Assisting in corneo-scleral suture removal (CSSR)
Eversion of eyelid
Assisting in foreign body removal
Schirmer test
Irrigation of theeye
Eyepatches and bandages

GOALS

To enhance the ophthalmic assistant's understanding of the basics of out-patient procedures and their ability to perform the procedures without error.

OBJECTIVES

The OA will be able to

- Define slit lamp, Gonioscopy, Goldmann applanation and their uses
- Handle instruments carefully, which avoids unnecessary damage
- Position the patient comfortably for examination by the doctor
- State the basics of gonioscopy and assist the Ophthalmologist in gonioscopic examinations
- Understand the purpose and procedure of flourescein staining
- Assist an ophthalmologist while removing a corneal foreign body
- Assist the ophthalmologist in intraocular suture removal
- Understand the indications and complications of suture removal
- Demonstrate the procedure of eversion of lower and upper lid and eye irrigation

In the Out-patient department, the OA plays a crucial role in assisting the ophthalmologist in various procedures. The OA collects all the required equipment and instruments necessary for the procedure and gives appropriate instructions to the patient about the procedures. This saves time not only for the doctor but also reduces the waiting time of patients. In this unit the various out-patient procedures and the role played by the OA are described.

CHAPTER 4

Assisting in Out-Patient Procedures

The slit lamp biomicroscope is an instrument that allows detailed examination of the eye by providing a magnified image.

Uses of a slit lamp

A slit lamp is used to illuminate and examine under magnification the anterior segment of the eye. It enables the observer to view binocularly the conjunctiva, sclera, cornea, iris, anterior chamber, lens, and the anterior portion of the vitreous, and it helps to detect disease occurring in these areas.

- With the help of gonio lens, angle structures can be visualised. The 90D lens helps in visualising the retina and CDR (cup disc ratio).
- The blue light is used to see epithelial defect and abrasion in the cornea when it is stained by Fluroscein.
- The green light is used to visualise the optic disc and nerve fibre layer.
- Depth of anterior chamber can be calculated
- Diameter of the cornea can be assessed, both in the horizontal and vertical.
- Various slits, with different positions of the light source are used to visualise corneal pathology (eg: corneal guttae) etc. The slit lamp microscope is of special importance in conditions such as anterior uveitis and conjunctivitis, dendritic keratitis, foreign body, and early lens changes that are better diagnosed and treated by having a well illuminated and highly magnified view of the area.
- The attachment of an applanation tonometer permits measurement of the intraocular pressure.
- Camera attachments enable photography of the anterior segment of the eye.

The slit lamp consists of 4 important parts

1. Viewing arm - The examiner looks through a pair of eye pieces called oculars. The knurled focusing ring around each ocular can be twisted to suit the examiner's refractive error and inter-pupillary distance. The oculars are attached to a housing containing the instrument's magnification elements. Below this housing is a lever for adjusting magnification.
2. Illuminating arm - The illuminating arm can swing 180 degrees side to side on its base allowing the examiner to direct the light beam anywhere between the nasal and the temporal aspects of the eye.

   On the top of the illuminating arm is lamp housing containing light bulb. At the base of the housing, a window exposes a disk showing a calibrated scale that indicates the length of the beam being used.

   In a separate housing below the scale, is a lever for varying the brightness of the light beam. At the base of the housing is a projecting knurled knob. When this knob is twisted the length of the light beam varies. Accessible by either hands, knurled dual knobs for changing the width of the light beam are located.
3. Patient positioning frame - This consists of two upright metal rods to which a forehead strap is attached. The patient's chin is placed in the chin rest. Below the chin rest is a knob to adjust its height. A fixation light may be attached to a moveable arm, projecting from a cross piece above the two rods that form the patient positioning frame (Used for patients to fix the eyes).

4. Base - The slit lamp's joystick control is located on the base and can be moved forward, backward, laterally or diagonally. The joystick can be twisted and rotated to lower or to elevate the light beam.

There is a knob which when tightened prevents movement of the joystick and slit lamp. Under the joystick is the supporting platform.

Various additional devices can be attached to the slit lamp. An applanation tonometer, for example, can be used to record IOP; and a focusing test rod can be used to adjust the slit lamp's focus very accurately.

Assisting in slit lamp examination

Check the instrument and keep the necessary equipment ready for use. For example, if a suture or foreign body has to be removed keep a sterile tray with necessary articles (Fig. 4.1).

Fig. 4.1

Identify the correct patient for slit lamp examination. Explain the exact procedure to the patient and the reason for doing it. This will reduce the anxiety of the patient. Tell the patient that to get a magnified image of the eye, the eye is examined with the help of the slit lamp.

Explain to patients that they have to place their chin on the chin rest and their forehead against the headrest without discomfort, and to position the eyes corresponding to the level marked in the chin support panel. Help the patient in the process. Request the patient to co-operate with the doctor, so that the test will be over quickly. Clear the doubts of the patient by answering all his questions.

Communicate necessary information about the patient to the doctor. Assist the patient in maintaining a comfortable position throughout the procedure.

The doctor will adjust the chin rest and microscope so the beam of light falls on the cornea or other area to be examined. If the doctor examines the right eye, the patient is to be asked to fix his left eye.

The doctor then adjusts the narrow beam to be directed from the side of the cornea.

Maintenance of the slit lamp

- Keep the instrument covered when it is not in use to keep dust and debris at a minimum
- The instrument can be cleaned with a soft clean cloth. The slit lamp has a locking device that should be engaged when the examination is completed. If the slit lamp table is suddenly jerked and the slit lamp is not locked, it could be damaged
- The slit lamp should not be used as a writing table, because the ink of the ball pen causes a lot of ugly lines over the instrument
- The chin rest and hand rest should be wiped with an alcohol wipe between patients
- Never touch the mirror of a slit lamp because fingerprints will prevent full illumination and damage the mercury coating
- The slit lamp is to be thoroughly examined and cleaned properly by the instrument maintenance department or the OA
- Handle the equipment with care, as it is costly

Moving the slit lamp

- All mobile parts like light house, eye piece and handle should be locked
- Release the wheel brake so the slit lamp can be moved

Assisting in Gonioscopy

Gonioscopy is the procedure in which the angle of the anterior chamber is examined. Four structures, namely, Schwalb's line, the trabecular mesh work, the scleral spur and the ciliary body band are examined.

Indications for Gonioscopy

- In glaucoma patients for differentiation of the types of glaucoma (angle-closure or open angle)
- To visualise and remove a foreign body at an angle
- To study tumours of the iris and abnormalities of its angle
- To view the posterior of the iris, the ciliary body and the ciliary processes

Types of Gonio lenses

- Koeppe's lens: refracts light at an angle.
- Goldmann's lens: reflects light at an angle.

Prior to gonioscopy, refraction and undilated fundus evaluation and intra-ocular pressure recording have to be done, as the lubricant solution used in gonioscopy may alter those findings.

Procedure for assisting in a Gonioscopy evaluation

- Wash and dry hands.
- Explain to the patients the nature and need of this examination and gain their confidence.
- Inform the patient that the doctor will examine the internal structure of the eye with a special lens. Assure the patient that there will be no pain during the process, and patiently answer all of their questions to clear any remaining doubts.
- Apply one or two drops of 4% lignocaine ophthalmic solution into the eyes of the person to be examined.
- Give cotton to the patient, so that if the eye drops dribble outside of their eye they can wipe it.
- Seat the patient comfortably in front of the slit lamp and position the head in the frame opposite the examiner.
- Have the gonio lens ready. A clean and sterile lens should be filled with methyl-cellulose solution in order to avoid air bubbles which may intervene and obscure gonioscopic vision.
- Gently hold the patient's head along with the patient positioning frame and ask the patient to look up so as to facilitate easy application of the gonio lens and examination by the doctor. If the patient is apprehensive, the OA may have to help the patient keep the patient's eyelids open. When you help them to keep the lids open, do not use pressure but handle softly. Throughout the test, make sure that the patient is sitting comfortably.
- After the test is over, wipe their eye and the surrounding areas with clean cotton and help the patient get up if necessary.
- After completion of test, clean and sterilise the gonio lens and keep it ready for the next patient. Handle the gonio lens with care, as it is easily scratched or broken, and it is very costly(Fig. 4.2).

Fig. 4.2

Cleaning of the Gonio lens

Using a rotary motion, carefully wash the lens in lukewarm water with a moisture cotton ball that contains a few drops of dishwashing liquid

- Rinse with lukewarm water.
- Blot the lens dry using a lint free lens cleaning paper or absorbent cloth.
- Store the lens in a dry state in its chamber

Disinfecting Gonio lens

- Soak for 10 minutes in 2% glutaraldehyde solution
- Soak for 5 minutes in fresh 1:10 dilution of household bleach
- Remove from solution and rinse with water. 10 minutes of continuous rinse in tap water can sterilize the lens.
- Blot the lens dry using a lint free lens cleaning paper or absorbent cloth.
- Store the lens dry inside its case

Assisting in applanation tonometry

Definition of Intra Ocular Pressure (IOP)

Intra ocular pressure refers to the pressure exerted by the Intra ocular contents of the coats of the eye ball. It is maintained by the equilibrium between the aqueous humour formations, it's out flow and the episcleral venous pressure.

Normal IOP values:

Ranges between 10.5 and 20.5mm of Hg

Mean IOP = 15.5+ 2.5 mm of Hg.

Increase in IOP more than normal values indicates glaucoma.

Goldmann applanation tonometer

Basic aspects

- Reliable and accurate measurement of IOP is possible with Goldmann applanation tonometer.
- Universally accepted as a gold - standard method.
- Easy to perform after practicing.
- Requires a slit lamp to measure IOP.

Requirments

- 4% Xylocaine drops
- Fluorescein impregnated paper strips
- Cotton wiper
- Slit lamp

How it works

- The applanation tonometer is to be mounted on a slit lamp and the patient is positioned at the slit lamp
- It works by pressing against 3.06mm of the cornea and measures the size of the semicircle needed to flatten that area of the cornea
- It consists of a plastic prism with a flat anterior surface and a diameter of about 7mm

Procedure

- Explain the procedure and win the confidence of patient.
- 4% Xylocaine eye drops to be applied to both eyes. Before applying the drops the patient is to be informed that the drops may cause irritation for a minute, and then apply. Give clean cotton to the patient to wipe if the drops dribble outside the eye.
- Stain both the eyes with fluorescein. While staining the eye, care must be taken that the drops do not stain the patient's dress.
- Seat the patient comfortably at the slit lamp.
- Instruct the patient to look straight ahead and to open the eyes maximally and if needed the OA can help the patient to open the eyes maximally.
- Set the slit lamp illumination with cobalt blue filter.
- Once the patient is ready, move the tonometer forward with the joy stick of the slit lamp until it gently touches the centre of the cornea.
- Two bright yellow-green semicircular areas should be seen through the eyepieces of the slit lamp. They should be in a sharp focus and of equal circumference one above and one below, and center.
- Any needed correction is made by the joy stick of the slit lamp.
- Adjust the measuring drum such that the two semicircular arcs move until they just overlap. The inner edges of the semicircles should

coincide. This is the point at which reading should be taken.
- Reading that is obtained is to be multiplied by ten to convert into equivalent value in mm of intraocular pressure.
- Record the reading of each eye separately in the patient chart (Fig. 4.3).

Fig. 4.3

Care and maintenance

- Clean the instrument after each use with a clean cloth or sterile cotton swab.
- Soak the applanation tip in diluted H_2O_2 Hydrogen Peroxide (1:10 household bleach) for 5-10 minutes and it should be rinsed thoroughly with warm water and dried well before use.
- Soak in 70%iso propyl alchohol, prism should be rinsed and dried to prevent ephithelical defect. Wipe with alcohol, H_2O_2 iodophore (povidone iodine) 1:1000 merthiolate or dry tissue is also adequate. Alcohol should be allowed to evaporate and dry before use. Alcohol and 70% isopropyl alcohol can cause mild damage to tonometer tip; it needs to be handled carefully with especially after contact with high risk patients with infections like adenovirus, hepatitis, herpes and AIDS.
- Remove dirt from the Goldmann applanation prism that cannot be cleaned with the liquid by blowing it with the dry empty bulb syringe.
- Remove finger prints or oil from the applanation tip.
- Be sure that the cleaning agents are completely removed from the lens surface.
- Check the applanation surface, whether any breaks are present that could damage the cornea during the process.

Key points to remember

1. *Encourage the patient to look straight and keep eyes maximally open.*
2. *Help the patients to position them at the slit lamp. The tip of the applanating prism should not be touched at any time.*
3. *The applanation tip has to be cleansed and replaced in its case when not in use.*
4. *If the eyelids contact the applanation tonometer, half circles will spread out. Wipe off the tip and try again.*

Assisting in fluorescein staining

Required materials

(To define the crater of corneal ulcers flourescein and rose bengal dyes/stains can be used. Here we will confine ourselves to fluorescein.)

- Fluorescein-tipped paper strips or flourescein solution
- Sterile wiper jar
- Xylocaine 4%
- Hypromellose
- Sterile forceps
- Hand towel
- Soap with soap tray

Procedure

- Explain the fluorescein procedure to the patient. The eye will be stained with special dye to enable the doctor to diagnose accurately and decide the type of treatment to be given
- Wash hands before and after the procedure and do not touch the tip of the fluorescein strip
- The OA should apply sterile impregnated fluorescein strip/liquid dye to the eye by everting

the lower eye lid (if required, local anaesthetic drops of 4% Xylocaine can be added)

- Advise the patient to close and open their eyelid. The fluorescein will stick to the epithelial breaks (ulcers) in the cornea giving a yellowish-green colour. This is best seen with the blue light
- Clean the excess fluorescein in and around the eye with cotton
- The patient is then taken to the ophthalmologist for examination

Other uses of fluorescein

- In applanation tonometry
- To check the rigidity of a contact lens fitting
- To check the patency of the duct in children
- To check for aqueous leakage from anterior chamber in penetrating corneal wounds
- Dyes administered by injection may be used to evaluate retinal conditions (FFA)

Assisting in corneo-scleral suture removal (CSSR)

Required materials

- Sterile 26-gauge needle
- Sterile wiper jar
- Iodine
- Xylocaine 4%
- Kidney tray
- Antibiotic drops and ointment
- Sterile foreceps
- Hand towel
- Liquid soap
- 10-0 Nylon sutures are used for closure of wound in ECCE surgery with IOL implantation (either interrupted or continuous). Routinely these sutures are not removed, unless they cause irritation, or with the rule astigmatism is more than 2.5D

Time and indications

Suture removal is done only after 3 months following surgery so that adequate healing of wound has taken place. In some cases where there are loose sutures with adequate healing of section, suture removal can be done after one month. They are removed when there are:

- Loose sutures
- Exposed knots
- Irritation due to protruding ends
- High with the rule astigmatism >2.5D

Sutures can be trimmed or removed. Suture relaxation alone should not be done because the ends of the suture will protrude later and cause irritation. If sutures are deep, CSSR can be done at operating room.

Procedure

- All suture removal is done under slit lamp.
- Antibiotic drops are to be instilled at least 4-5 times at 15 minutes intervals prior to CSSR.
- Clean the slit lamp
- Gather the materials needed
- Wash hands thoroughly and dry
- Clean the patient's eyes
- Topical 5% povidone iodine beta dine eye drops are to be instilled in the patient's eye
- OA should have knowledge of making the patient comfortable under the slit lamp
- 4% Xylocaine drops are to be used as local anaesthesia
- Doctor should wash hands twice
- Assist the doctor in this procedure
- Suture-cutting is done using 26G disposable needle or with a sterile blade
- Cut sutures are pulled and removed with sterile forceps
- Antibiotic drops are instilled after CSSR

- Pad and bandage is applied (Not for one-eyed patient) with antibiotic ointment
- In cases where suture removal is done for reducing astigmatism, repeat refraction after 30 minutes and give a spectacle prescription during the next visit.
- All CSSR patients are advised to use antibiotic drops 4 times a day for 1 week and to report back immediately if they develop pain and decreased vision.
- Clean the slit lamp and replace the materials for the next case.
- Bio-waste needles should be discarded.
- Instruct the patient to carry out doctor's advice.

Possible complications

- Gaping wound
- Infection (This is the worst complication. Once endophthalmitis develops, vision is completely lost).
- Corneal abrasion
- Bleeding

Eversion of eyelids

Eyelid eversion is useful because it helps in thoroughly evaluating lesions and detecting the presence of foreign body. It also makes sure the eye is thoroughly irrigated. (Fig. 4.3a & Fig.4.3b, Fig.4.3c)

- Eversion of the lower eyelid: The lower lid is drawn down and the patient is asked to look up. Do not apply drops and ointment after everting the lower eyelid
- Eversion of the upper eyelid

Ask the patient to look down. Hold the upper eyelid lashes with thumb and index finger and pull it away from the eye. With the help of the small finger of the other hand or a glass plate, the upper margin of tarsal plate is depressed and the lid is turned up. It requires sufficient practice. When releasing the eye lid, release in a gentle fashion. Most of the time eversion of the eyelid can be done using one hand alone.

Fig. 4.3a

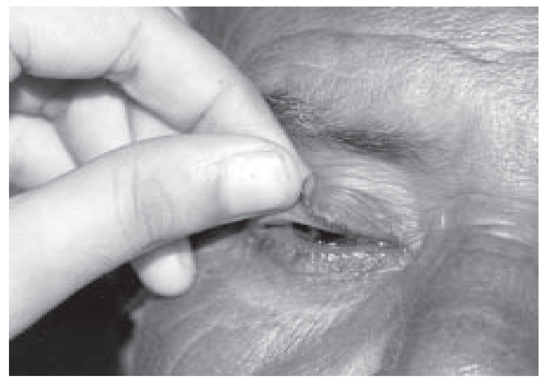


Fig. 4.3b

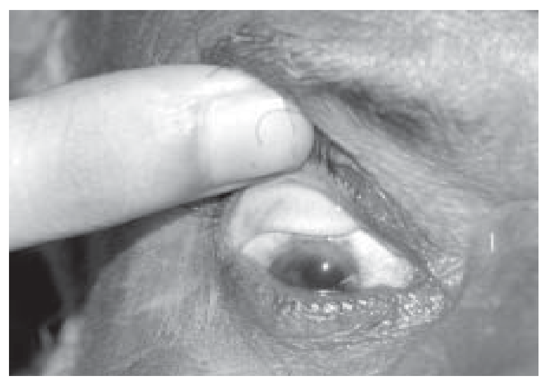


Fig. 4.3c

Assisting in foreign body removal

History taking

A corneal foreign body may consist of dust, iron filings, vegetable matter, or sand and mud particles. Here are some questions to ask the patient with a foreign body in their eye.

- What was the mechanism of injury?
- Was the patient wearing safety glasses?
- Did the foreign body arise from metal striking metal, which may suggest an intra-ocular foreign body?

Document the visual acuity before any procedure so that it can be compared with vision taken after the treatment. Multiple or loose foreign bodies can often be removed with saline irrigation. The foreign bodies can be removed with cotton-tipped applicator or with fine forceps.

Required materials

- 26 gauge sterile needle
- Sterile wiper jar
- Sterile foreceps
- Xylocaine 4% eye drops
- Antibiotic ointment
- Hand towel
- Soap with soap tray

Procedure

- Test the visual acuity of the patient and record it in the case sheet.

  Help the patient get into position for slit lamp examination by the doctor.
- Apply anesthetic drops 4% xylocaine and reassure the patient.
- Encourage the patient to look straight ahead and to cooperate.
- Help the doctor by holding the head of the patient gently against the forehead rest of the slit lamp.
- Once the foreign body is removed either with a needle or cotton swab, apply a drop of antibiotic eye drops.
- Apply antibiotic ointment. If cycloplegics are applied, inform the patient that they may have blurred vision for a day or two, depending on the drug used.
- Apply a sterile pad and bandage to the eye. Give proper instruction for follow up or other necessary things as instructed by the doctor.
- Be gentle in all the proceedings because a patient with a corneal foreign body will have intense pain.

Schirmer test

Schrimer test is a measure of tear secretion measured with an absorbing paper strip.

Required materials

- Schirmer filter paper strip
- Sterile wiper jar
- Sterile forceps
- Hand towel
- Soap with soap tray

Procedure

- Seat the patient in a dimly lit room with the back of the head stabilised against the headrest of the examining chair, and then explains the procedure.
- Remove any excess moisture from the patient's eyelid margin with a facial tissue or cotton-tipped applicator. Do not instil any eye drops before the test.
- Fold a packaged, sterile Schirmer paper strip at the indentation mark. To avoid contaminating the sterile strips, bend the round wick end of the test strips at the notch before opening the pouch.
- Open the pouch and remove a strip. Use the strip with the angled end for the right eye. Grasp the strip by the non-wick end to avoid contaminating the wick end with your fingertips.
- Ask the patient to look up, draw the lower lid gently downward, checking to make sure that the lid margin has been adequately dried with a cotton-tipped applicator. By convention, the strip with one corner cut off is used for the right eye.

- Place the rounded, bent end of the test strip over the lower eyelid margin of each eye and release the lower lid to hold the strip in place. The strip is typically placed at the junction of the inner two thirds and the outer one third of the eyelid margin. It should not touch the cornea. The notch should point toward the lateral canthus. Check to make sure that the short end of the strip is inserted all the way to the notch.
- Ask the patient to look slightly above the midline with the eyelids open in subdued light. The patient may continue normal blinking. Patients are permitted to keep their eyes closed during the test, but squeezing should be discouraged.
- Note the time. After 5 minutes have elapsed, remove both strips.
- Measure the distance between the indentation mark and the farthest extent of wetting. Standardised strips are packaged in an envelope with a millimeter scale. Do not include the bent wick end in the final measurement.
- Record the result in the chart as follows: Schirmer testing (without anesthetic): right eye: X mm/5 minutes. If complete wetting occurs before 5 minutes, this time should be noted.

Irrigation of the eye

Irrigation of the eye is done to remove dust or any other foreign particles from the patient's eye. Sterilised water will be applied into the eye with a syringe continuously for 10 to 15 minutes to bring out the foreign material.

Required materials

- Sterile ringer lactate solution
- Sterile wiper jar
- Kidney tray
- Sterile rubber cork with two glass tubes
- Antibiotic drops and ointment
- Cap
- Sterile forceps
- Hand towel
- Soap with soap tray

Indications for irrigation

- Chemical injuries (acid and alkali injuries)
- Foreign bodies in eye (especially when lodged under the upper lid)
- Periodic irrigation during ocular surgeries

Procedure

- Explain the procedure to the patient and ask them to lie down. Tell them that the eye will be washed with sterile water with a syringe, to flush out any dust particles or foreign material. Ensure the patient that the process will not be painful and syringe will not touch the eye (Fig. 4.4).

Fig. 4.4

- Put a towel around the patient's shoulder so that the patient's dress will not be drenched. Keep a small cotton ball in the ear so that water will not enter the ear.
- Wash and dry your hands.
- Apply local anesthetic drops (4% Xylocaine).
- Help the patient lie down and ask them to turn to the side of the eye to be irrigated. A patient has come with foreign body in the left eye. Ask the patient to lie down turning to the left side so that the kidney tray could be held against the face and irrigation could be done easily.

- The kidney tray is to be held firmly, against the face and it should not be painful.
- Instead of irrigating the eye first, practice on the cheek first, so that the patient will have an idea about the process. Before separating the eyes, inform the patient that you will be separating the eyelids to irrigate the eye. Without informing them, if you separate the eyelids they may be shocked. After separating the eyelids, tell them that saline will be poured onto the eyes.
- Saline should be poured continuously and uniformly. Ask the patient to look up and down and sideways to expose the conjunctiva fully. It is not enough to have the patient follow your finger. Give instructions verbally. Wash all parts of the conjunctival sac. Straighten the upper eyelid. Use the entire amount of liquid given to irrigate
- After irrigating the eye, dry the eyelashes softly with sterilized swab
- Remove the tray and see that the patient is comfortable
- Record the procedure and remove the instruments

Instead of a bottle, irrigation by syringing can also be done. Make sure to irrigate for at least15 minutes for chemical injuries. Always be gentle to avoid causing injury to the eye.

Eyepatches and bandages

Applying a patch to the eye

- Set out two eye pads and close the patient's eyes either by instruction or manually.
- Fold the first pad in half. Place it over the eye with one hand and hold it in place.
- With your free hand, apply the second pad over the first. (Fig. 4.5 & Fig. 4.5a, b).
- Place the plastic shield over the two cotton pads. Apply a single piece of tape at an oblique angle just above the brow of the opposite eye. Firmly press the tape against the skin medial to lateral so that 6 to 7 centimeters of tape contact the skin above the cheekbone and forehead.
- A long piece of bandage cloth measuring 1mx 10cm. can be tied over it as shown in the figure.
- It should be tied just tight enough to secure the pad properly.

Fig. 4.5

Fig. 4.5a

Fig. 4.5b

- The knot should come on the forehead and it should be neatly trimmed. (A knot on the side interferes with the sleeping posture of the patient)

Summary

In this unit the out-patient procedures and the role of the OA are explained. The patient will be tested by the ophthamologist in the above mentioned procedures and the OA should have the knowledge of the procedures to assist the doctor and patient effectively. The OA is to collect and check the required materials and keep everything ready so that the doctor can proceed without delay. The OA must be well versed in maintaining the equipment and instruments.

Key points to remember

- *Always remember to clean the slit lamp in between patients.*
- *Handle the instrument carefully to avoid any damage.*
- *The instruments should always be kept in working condition.*
- *Always store the Gonio lens in a dry state in its case.*
- *The tip of the applanating prism should not be touched at any time.*
- *Document the visual acuity before any procedure so that it can be compared with the vision taken after the treatment.*
- *Wash and dry your hands before any procedure.*
- *When you touch the eyelid do not press it hard.*
- *Xylocaine 4% should be changed daily to avoid infection.*
- *Strict aseptic technique should be followed throughout the procedures.*
- *After CSSR no head bath should be taken for one week.*
- *Advise the patient to come immediately to the hospital if pain develops in the eye.*

Student exercise

I. Answer the following

1. *How does one prepare the patient for slit lamp examination?*
2. *List the uses of slit lamp.*
3. *What is gonioscopy and its importance?*
4. *What are the types of gonio lenses and the most commonly used one?*
5. *What are some practical ways in positioning the patient for gonioscopy and assisting the doctor?*
6. *What are the ways to keep gonio lens clean and disinfected?*
7. *Write the definition of intra-ocular pressure.*
8. *How does one maintain an applanation tonometer?*
9. *What are the uses of fluorescein?*
10. *List the required materials for the suture removal.*
11. *Mention the uses of eversion of eye lids.*
12. *Briefly explain the irrigation of the eye procedure.*

II. Write true or false

1. *A slit lamp is used to check the anterior segment of the eye.*
2. *A slit lamp can be cleaned by spirit / hand rubs.*
3. *Fluorescein stain is used before gonioscopy.*
4. *Schirmer test is done for dry eye.*

CHAPTER 5 ASSISTING IN SPECIAL PROCEDURES

CONTENTS

Corneal scraping
Fundus fluorescein angiography
Ultrasonography
Corneal topography
Optical coherence tomography
Assisting in incision and drainage of abscesses
Assisting in fitting a prosthetic eye
Laser capsulatomy
Nd Yag peripheral iridotomy

This unit deals with the special procedures done for the patient. These procedures are not performed on all out-patients but only on people who really need them. The OA should be well versed with the procedures and be able to help the doctor in conducting the tests.

GOALS

To enhance the ophthalmic assistant's ability to assist in PCO types with the Nd YAG laser, PRP techniques, Fundus Fluorescein Angiography and Ultrasonography

OBJECTIVES

The OA will be able to

- List the name of culture media for bacteria/fungi
- Define PCO types, and the principle of the Nd Yag laser
- List the indications, contra-indications of the procedure
- Advise the patient on post-laser treatment and follow-up
- Describe the technique and complications of PRP
- Describe principle of FFA
- List the preparations, side effects and procedure for assisting in FFA
- Discuss the basic principle of OCT, including its advantages and disadvantages. Also, they should be able to demonstrate how to assist during the procedure.
- Describe the principle of USG and the different types of USG, list the indications and describe the examination technique.
- Define corneal topography, list indications, and efficiently assist during the procedure
- Describe types of artificial shell
- Explain the insertion, removal, and care of ocular prostheses
- Perform / assist incision and drainage of abscesses in the eye

CHAPTER 5
Assisting in Special Procedures

Corneal scraping

The OA will know the procedure, applications and how to assist the ophthalmologist in corneal scraping in a patient with corneal ulcer.

The test is used to identify of pathogens present in the cornea, their nature and the drugs to which they are sensitive. By plating on culture media or slides by staining and identifying the pattern of drug sensitivity, the pathogens can be eradicated.

Collecting external specimens

Collection of corneal specimens is preferably done by the ophthalmologist. Conjunctival material may be collected by the trained OA from the Microbiology laboratory.

A collection kit must readily be available and include

- Spirit lamp
- Match box
- Kimura spatulas
- Disposable sterile blades
- Spirit in coplin jar
- Clean microscopic slides (preferrably new ones)
- Diamond marking pencil
- Glass marking pencil / pen
- Topical anaesthetic
- Fresh growth media solid
- Transport liquid (2 SP / HBSS)
- Sterile cotton tipped swabs
- Coplin jar containing 95% methyl alcohol
- Coplin jar with cold acetone
- 10% potassium hydroxide dropper

The OA should collect all the above mentioned equipment in advance and keep it ready for the ophthalmologist.

Procedure

- Instruct the patient about the procedure and stress the importance of the test for treatment of ulcers and lesions
- Explain to the patient that there will be no pain during the procedure, but that there will be some stinging sensation. Stress the importance of scraping for the treatment of their ulcer or lesion
- The patient is to be seated at the slit lamp if a microscope is to be used for corneal scraping
- Help the patient to keep the chin on the chin rest and the forehead on the headband. If the scraping is done with the patient lying down, help the patient to do so comfortably
- Instil a topical anaesthetic of 2% lignocain into the affected area and inform the patient that there will be some stinging sensation
- Heat the Kimura spatula in a spirit lamp and cool it for one minute
- Keep the glass slides and medico plates ready (glass slides and medico plates must be obtained from the microbiology lab and stored in a clean container. Fresh ones are to be supplied once in five days.)
- Obtain necessary culture media like Blood Agar, Sabouraud's, and other media as requested by the doctor
- Keep a glass slide and cover slip ready
- Gently separate the eye lid of the patient while scraping is being done and ask them to look straight

After the scraping

- Instil one drop of Homotropine or Atropine
- Ask the patient to wait while the ophthalmologist / microbiologist performs the KOH mount / gram stain

- Once the ophthalmologist prescribes the drugs explain the method of application of eye drops and its proper usage to the patient
- Explain the importance of regular follow up to the patient

Student exercise

Answer the following

1. *What is corneal scraping?*
2. *What is the procedure for performing scraping?*
3. *How does one assist in corneal scraping?*

Fundus fluorescein angiography (FFA)

Fluorescein sodium is an ophthalmic dye made of Phthalic Acid and Resorcinol; it absorbs shorter wavelength rays and emits longer wavelength rays. Stages of performing FFA include the Pre-Arterial phase, the Arterial phase, the Arterio-venous phase, the Venous phase, and the Late phase.

Abnormal findings of FFA

- Hypo-Fluorescence in ischaemia, obstruction, media opacities (Dark colour)
- Neovascularisation /causes hyper fluorescence due to leakage (Bright colour)

Preparation

- 5 ml of 10% solution
- 10 ml of 5% solution
- 3 ml of 25% solution

Side effects

- Yellowish discolouration of skin and urine for 12-24 hrs
- Positive urine sugar for 36 hrs
- Dyschromatopsia

Symptoms of toxic reaction

- Nausea
- Vomiting
- Urticaria
- Allergic skin reaction
- Hypotension
- Shock

Assisting in FFA

- Explain the procedure to the patient in their own language. Tell them a yellow coloured fluid will be injected through veins which will spread into the body. In the eye angiogram, the dye could show the affected parts. This helps the doctor with their diagnosis. Mention that the test is essential for the proper diagnosis of the eye problem and ask the patient to cooperate for the test (Fig. 5.1).
- Get a written consent form from the patient.
- Explain to the patient that the dye will be injected via an intravenous scalp-vein needle.
- Enquire about any history of previous allergic tendencies. If the patient has any allergic problem, their general physician should be consulted and as per their advice further steps should be taken.
- Explain the risk of allergy and anaphylaxis to the patient.
- Ensure that emergency medicines are ready before injecting the dye.
- Explain to the patient that there will be a yellowish discolouration of skin and urine.
- Inform the patient that they can have positive urine sugar for 36 hours.
- Emphasize to the patient the importance of fixation.
- Ensure full dilatation of the patient's pupil.
- Assist the patient to sit comfortably.
- Gently open the eyelids.
- Help the patient look in the desired direction.
- When the patient enters the room, there will be bright light but when the test starts the lights will be switched off and the patient become fearful. Before switching off the lights inform

the patient and ensure that you will be at their side for the entire test if they need help.

Fig. 5.1 - Assisting in FFA

Possible emergencies during the procedure

The technician will be concentrating in the process, so the OA who assists must be very alert. She will be near the patient, and has to observe the patient closely to be ready for any emergency.

- Giddiness: The patient may be normal in the beginning of the test, but after a few seconds giddiness may develop. Sometimes in the beginning of the giddiness the patient may think that he or she will be able to manage it but then may become unconscious. Unless the OA is alert, they will not be able to avoid unnecessary problems.
- Vomiting: The patient would have been instructed that two hours starvation is a must for the test and not even coffee or water should be taken. But in spite of that, patient may vomit. Sometimes the patient may vomit in the chin rest itself.
- Allergic skin reaction: If any allergic reaction is found, the OA must immediately inform the technician and doctor. According to the instructions of the doctor further steps will then be taken.

Student exercise

Answer the following

1. What is the principle of FFA?
2. What are the stages of FFA?
3. What are the side effects of FFA?

Ultrasonography

Ultrasonography uses inaudible high frequency sound waves to scan the tissues, which reflect back the echoes, providing information about the integrity of the structure otherwise not visible. USG uses piezo-electric crystals which convert electric impulses into ultrasound waves. The returning echoes from the tissues are received and converted into electric signals which are seen on a monitor, and printed or photographed. Scanning is primarily used to examine optic nerve lesions and tumours.

History

The A scan was first used in 1956 by Mundt and Hughes. The B scan was first used in 1958, by Baum and Greenwood. Karl Ossoinig developed the first standard A and B scans.

Instrumentation

A Scan: This is a time-amplitude scan that produces uni-dimensional image with the echoes plotted as spikes. Their latency indicates their distance and their amplitude indicates their sound reflectivity. Retinal spikes have 100% reflectivity. Five principal echo spikes are present: Cornea, anterior lens, posterior lens, retina, sclera and orbital fat.

B Scan: This is an intensity-modulated scan that gives two dimensional image. A graphic view of tissue helps to provide the location, dimension and configuration of the structure. The B Scan has three orientations; longitudinal, transverse and axial.

Types of scans

- Axial - length biometry A Scan
- Corneal pachymetry A Scan
- Standardised and non-standardised A Scan
- Diagnostic B Scan

Indications

For the anterior segment

- In opaque media: for detection of
    a) Dislocated / subluxated lens
    b) Cataract
- In clear ocular media: for diagnosis of iris and ciliary body tumours

For the posterior segment

- In opaque media: detection of
    a) vitreous haemorrhage
    b) retinal detachment
    c) intra ocular foreign body
- In clear ocular media:
    a) Rumour (size/site/post-treatment follow-up)
    b) RD

Biometry

- Pre-operative scanning is done to determine IOL power.
- Post operative verification is done to determine the eye length when the refraction differs from surgeon's expectations.

Orbital examination

- Exophthalmos
- Palpable orbital mass

Handling a scan

- Always check the instrument before usage
- Wash and dry hands before working
- Administer 1 drop of 2% lignocaine
- Allow 2 to 5 minutes for the local anaesthetic to act
- Explain to the patient that you will be touching his/her eye with an instrument, but they will not feel it. Ensure them the instrument will not hurt the eye
- Applanate the cornea using the hand held ultrasound transducer probe. This is repeated thrice
- Ask the patient to look straight ahead (for IOL power calculation)
- Record the readings for each eye separately in the patient's chart

Practical usage of B Scan

The B scan is performed by the ophthalmologist (Fig. 5.2).

Fig. 5.2 - B-Scan

The OA is to

- Explain the procedure and its importance to the patient in their language
- Reassure the patient, if the patient is uncooperative
- Communicate well with the patient to reduce anxiety and clear their doubts
- Be gentle while applanating the cornea for A scan- too much pressure will give inacurate measurement
- Handle equipment with care
- Make the patient lie down comfortably while ophthalmologist performs the B scan

Maintenance

- Keep the instrument covered when not in use
- The instrument can be cleaned with a soft clean cloth

Student exercise

Answer the following

1. *List the types of ultrasonography.*
2. *What are the indications for ultrasonography?*
3. *What is the practical usage of A Scan?*
4. *How to prepare patient for A and B scan?*

Corneal topography

Corneal topography is a method of corneal curvature examination assisted by computer analysis. The corneal topographer consists of a computer linked to a lighted bowl; it projects a series of illuminated rings on to the corneal surface, which are reflected back into the instrument. The reflected rings of light are analysed by the computer and a topographical map of the cornea is generated.

Corneal topography with computerised videokerotoscopy provides colour coded maps of the corneal surface. The dioptric powers of the deepest and flattest meridians and their axes are calculated and displayed.

A series of data points are generated on a placido disk which has been projected on the cornea.

Indications

- To calculate meridians astigmatism associated with contact lens wear
- To diagnose the corneal distortions such as early keratoconus and keratoconus suspects
- To evaluate pre and post operative changes in corneal shape after refractive surgery, corneal grafting or cataract extraction
- To reveal the corneal scarring
- To detect irregularities in corneal shape

Scales

- Absolute scales.
- Relative scales.
- The cool shades of blue and violet represent flatter areas of the cornea.
- The warmer shades of orange and red represents steeper areas of cornea.
- The corneal topographer allows the surgeon formulate a 3D perspective of the corneal shape.

Advantages

- This procedure is painless and brief.
- It is a non contact examination that photographs the surface of the eye using ordinary light.
- The greatest advantage of corneal topography is its ability to detect conditions invisible to most conventional testing.

Assisting in corneal topography

- Help the patient sit comfortably.
- Enter the patient's details in the computer.
- Describe the purpose and nature of the procedure in detail in the patient's own language.
- Adjust the height of the chin rest, to keep the chin and for head against the head band.
- Ask the patient to look at the light in the centre.
- After the topography is over, take the print out and make sure that it is attached to the case sheet.

Uses of corneal topography

Corneal topography is used in the diagnosis and management of various corneal curvature abnormalities and diseases:

- Keratoconus / keratoglobus / pellucid marginal degeneration
- Corneal scars or opacities
- Corneal deformities
- Fitting contact lens
- Irregular astigmatism following corneal transplanting (for suture removal)

- Planning refractive surgery
- Post-operative cataract extraction with required astigmatism
- Suture relaxation in astigmatic kertotomies

Student exercise

Answer the following

1. *What is corneal topography?*
2. *What are the indications?*
3. *Mention the various colours and their importance.*
4. *What are the types of scales?*
5. *What are the uses of corneal topography?*
6. *Write two advantages of corneal topography over Keratometry*

Optical Coherence Tomography (OCT)

This is a non-invasive, non-contact, trans-pupillary imaging technology that can make an image of the retinal structure with a resolution of 10-17 microns using the reflection of light from different structures within the eye.

Procedure

- The beam is focused on retina using a 78 D condensing lens
- An infrared camera is used to view fundus and beam
- Ocular fixation is achieved using a computer-controlled light that fixates the scanned eye or an externally-mounted light on a slit lamp
- Dark colours (like blue and black) reflect areas of minimal optical reflectivity and bright colours (as red and white) represent areas of high reflectivity

Uses

- Studying macular holes
- Studying the Epiretinal Membrane
- CSR (Central Retinopathy)
- Diagnosing ARMD (Age-related macular degeneration)
- Determining RNL thickness (Retinal nerve fiber layer) (Fig. 5.3).

Fig. 5.3 - OCT procedure

Advantages

- Objective
- Quantitative
- No contact with the patient
- High resolution

Disadvantages

- Limited uses in media opacities like cataracts or vitreous haemorrhage.

Preparation of patient

- Explain the procedure to the patient, in their own language.
- Explain the advantages.
- Explain to the patient the importance of steady fixation. If there is no steady fixation it will take a long time to complete the test.
- Seat the patient.
- Adjust stool, table and chin rest for optimal patient comfort.
- Keep their chin over the chin rest and forehead against the head band gently.
- Tell them to steadily fixate on target light.
- Gently separate the eyelids, when the probe beam is focused.

Student Exercise

Answer the following

1. *What is optical coherence tomography?*
2. *List principle uses, advantages and disadvantages of optical coherence tomography.*
3. *How do you prepare a patient for optical coherence tomography?*

Incision and drainage of abscesses

An abcess is a collection of pus. Incision and drainage is indicated whenever there is an abscess. Examples of abscesses include:

- Lacrimal sac abscess
- Meibomian gland abscess
- Orbital abscess
- Dermoid cyst of orbit, which gets infected and forms an abscess
- Lacrimal sac abscess

Symptoms and signs

A patient may have an abscess if they are exhibiting such symptoms as:

- Pain
- Swelling (with or without pus)
- High temperature
- Warmth, tenderness and redness in the affected area

Incision and drainage

- In lacrimal sac abscess a curved incision of 1cm just below the supra-orbital margin and at its temporal extremity is made.
- Orbicularis oculi muscle is split and an opening is made.
- Abscess cavity is cleared of pus.
- A drain is inserted to the lower end.

Assisting in incision and drainage

- Explain the procedure to the patient
- Answer all their questions
- Make sure that patient has started the antibiotics
- The OA should clean the abscess site with betadine solution
- The OA should scrub properly
- Drape the affected area
- Hand over the instruments to the surgeon as and when required
- Help in cleaning and draining the pus
- Apply a pad and bandage to the area

Post-operative treatment

- The incision is dressed for 24 hours
- The incision generally heals in a week
- Appropriate antibiotic are to be started prior to Incision and drainage and continued 5 days post operative
- Analgesics and anti inflammatory are given as needed.

In the ward

- The dressing is to be removed after 24hrs
- Clean the incision with betadine and antibiotic drop is to be applied.
- Make sure that patient is receiving antibiotics and analgesic

Student exercise

Answer the following

1. What is an abscess?

2. How will you assist in incision and drainage?

Assisting in fitting a prosthetic eye

Prosthesis is an artificial substitute for a missing part, such as an eye, a leg, or a tooth used for functional and/or cosmetic reasons. An ophthalmic prosthesis is necessary because without a conformer or prosthesis in place the eye socket can contract in a matter of days.

Indications

- Following enucleation, evisceration, escentration
- Pthisical eye-contracted eye due to injury or by birth
- Approximately 4-6 weeks after surgery, the patient is ready for first prosthetic fitting.

Ideal prosthesis

An ideal prosthesis is custom-fitted to the exact dimension of the socket. Pre-made or "stock" eye prosthetics are:

- Less satisfactory cosmetically
- Prone to causing more discharge
- Less comfortable

Other options include a cosmetic contact lens for corneal opacities, a scleral lens or cosmetic shell (used when the cornea is irregular).

Instructions to the patient during insertion of ocular prosthesis

- Wash hands thoroughly and insert the prosthesis wet (Fig. 5.4).
- Facing mirror, hold the artificial eye between the thumb and middle finger so that the upper edge of the prosthesis is upward and back of the prosthesis is towards the socket.
- The second / index finger is used to push on the front surface once the prosthesis is inserted under the upper lid.
- Using the index finger, push upward on the front surface of the prosthesis and release the thumb and middle finger.
- Hold this position for the next step.
- Do not let the prosthesis slide downward.
- Release the free hand holding the upper lid, and pull down the lower lid sufficiently to allow ample opening for the prosthesis to be fully inserted.
- Press inward and upward, while the index finger holds the prosthesis in place.

Fig. 5.4 - Fitting a prosthetic eye

Care of the prosthesis

The most important instructions for the patient receiving prosthesis concern maintaining proper hygiene:

- The patient is to be told that bacteria exist in the nose, scalp, ears, lashes and face that can cause infection. General cleanliness is to be stressed.
- Bactericidal soap should be used to wash their hands.
- Avoidance of unnecessary wiping of the eye is to be advised. If the patient rubs the eye, he/she has to rub towards the nose with the eye lids closed. Wiping away from the nose may cause the eye to fall out.
- Wash the prosthesis with a mild soap detergent, not a powder cleanser.
- While the prosthesis is wet, rub all surfaces briskly with clean facial tissue.

- Rewash the prosthesis again and insert it into the socket. Cleaning can be done every fifteen or thirty days depending on the socket's condition.
- Never expose the plastic eye to alcohol, ether, chloroform or any solvents. These may damage the plastic beyond repair.

How to remove the prosthesis

- Wash hands thoroughly before removal.
- Gently pull the lower lid downward and remove the prosthesis using an outward and downward motion.

Life and replacement of the prosthesis

A plastic prosthesis will last for five to seven years before it needs to be replaced. Over time, the prosthesis's surface and edges become rough due to salt deposits. The patient should come to the hospital for follow-up visits every six months, and the prosthesis should be polished once a year.

Laser capsulotomy

Posterior capsular opacification (PCO) is the most common long-term complication of IOL surgery. In adults, the time of surgery to visually significant opacification varies from one month to years. In young patients, almost 100% opacification occurs within two years of surgery.

Types

- Fibrous type: Multiple layers of anterior lens epithelium migrates and becomes opaque
- Elschnig type: Migration of equatorial epithelial cells with formation of small pearl like opacities

Principles of Nd Yag Laser

- Photo disruption
- Very intense laser energy is focussed into a small area for a very short period of time producing a hole in the opacity

Pre-laser assessment

- Visual acuity
- Direct and indirect ophthalmoscopy - to visualise fundus
- Retinoscopy
- Slit lamp assessment of opacification

Indications

- BCVA symptomatically decreased as a result of hazy posterior capsule
- PCO preventing clear view of fundus required for diagnostic and therapeutic purposes
- Monoocular diplopia or glare
- Releasing of capsular phimosis

Contraindications

1. Absolute

- Inadequate visualisation of posterior capsule eg., Corneal scars, corneal edema
- An uncooperative patient

2. Relative

- Known / suspected CME
- Active intraocular inflammation
- High risk for RD

Technique

- Can be done with or without a contact lens
- Use the smallest amount of energy possible with which the posterior capsule can be cut (0.8mj-3.5mj)
- Perform a cruciate opening
- Begin at 12 o'clock periphery
- Progress towards 6 o' clock position
- Cut across at 3 and 9 o'clock position
- Clear up residual tags

The capsulotomy should be as large as the size of pupil in ambient light.

Timing

A YAG Laser posterior capsulotomy is not done less then 6 months after surgery. The procedure is only performed when visual acuity significantly diminishes due to posterior capsule opacification.

Complications

- Elevation of IOP
- Damage to IOL
- Cystoid macular edema
- Retinal detachment – rare, definite risk in myopia patients

Post-laser treatment

- After the Nd YAG laser capsulotomy, 1% apraclonidine is administered topically to contol spikes in IOPs
- Topical steroids for 1 week

Follow-up

- After 1/2 to 1 hour, repeat Refraction
- Review the patient's condition after 4–6 weeks

Preparation of patient

- Describe the purpose and nature of the procedure in detail, to the patient in his / her own language
- Dilate the pupil to about 4 to 5mm, facilitating visualization of posterior capsule.
- No anaesthesia is required.
- If a contact lens is used, administer one drop of 2 % Lignocaine to the eye to be treated.
- Explain to the patient that there will be some burning sensation due to local anesthetic instillation which is transient
- Allow 2 to 5 minutes for the anaesthesia to act
- Explain to the patient that the procedure will be painless
- Explain to the patient the importance of steady fixation.
- Apply 1% aproclonidine five minutes before treatment to avoid post laser spike in IOP

During the procedure

- Reemphasise the importance of steady fixation.
- Adjust the stool, laser table, chin rest and foot rest for optimal patient comfort. Keep patient’s chin over chin rest
- Apply the headstrap to maintain forehead position
- Provide a fixation target for fellow eye

After the laser capsulotomy

- Apply 1 % apraclonidine drops to the lasered eye.
- Reassure the patient
- Make sure that refraction is done after half to one hour
- Explain to the patient the application of steroids eye drops

Nd YAG peripheral iridotomy

This is a simple, safe, out-patient procedure done under topical anaesthesia

Indications

- In acute angle closure glaucoma, after the acute attack has been treated
- Prodromal stage of angle closure glaucoma
- Chronic angle closure glaucoma
- Aphakia / pseudoaphakia with pupillary block.
- Malignant glaucoma
- Prophylactic laser iridotomy? in-patients with occludable anterior chamber angles
- Nanophthalmos
- Pigment - dispersion syndrome

- To penerate non-functioning PI.
- Combined-mechanism glaucoma

Counterindications

- Corneal edema
- Corneal opacification
- A completely sealed angle and angle closure by 360 degree peripheral anterior syneche in neovascular glaucoma.

Yag laser iridolenticular synecheolysis for uveitis

Iridolenticular adhesions on pharmacologically undilatable pupils are common in many ocular diseases, especially uveitis. They cause iris bombe and peripheral anterior synechiae, and they interfere with vision and treatment of secondary glaucoma. In all such cases, releasing the adhesions should provide relief.

Procedure

- Topical anaesthetic is applied to the affected eye.
- Patient is seated in front of the Nd YAG machine
- Contact lens may be used
- Laser iridotomy is performed first
- The synechiae are cut by 1 mJ of power towards the surface
- Try to release as much posterior synechiae as possible

Preparation of the patient

- Seat the patient comfortably
- Describe the purpose and nature of the procedure in detail to the patient in their own language. Explain the patient that the procedure will be painless
- Explain to the patient the importance of steady fixation
- Dilate the pupil to about 4 to 5mm, facilitating visualisation of the posterior capsule
- No anaesthesia is required
- If a contact lens is used, administer one drop of 2 % lignocaine to the eye to be treated
- Explain to the patient that there will be some burning sensation due to local anesthetic instillation which is transient
- Allow 2 to 5 minutes for the anaesthesia to act
- Apply 1% aproclonidine five minutes before treatment to avoid post-laser spike in IOP

Instructions for post-laser management

- Continue usual anti-glaucoma medications
- Explain to the patient how to use topical steroids (these are prescribed for a longer period of time than after a laser capsulotomy)
- Emphasize regular follow-up

Pan-retinal photocoagulation

Indications

- Proliferative diabetic retinopathy (high risk and early PDR)
- Rubeousis Iridis due to any cause, Neovascularisation of angle
- CSME (clinically significant macular colour)
- CRVO and BRVO (Sector PRP)

Specifications

- Types of lasers used: Argon blue green, argon green, frequency-doubled Nd / YAG
- Spot size : 500 microns (50mm-500mm)
- Duration : 50-200ms (50-500ms)
- Power : Sufficient to produce a gray-white spot
- Pattern : Around 1500 spots in 2 or more settings

- Extent : From just nasal to optic disc, outside the temporal vascular arcade and 2 DD temporal to macula

Possible complications

- Loss of visual field
- Macular edema
- Pain
- Tractional RD / exudative detachment

Preparation of patient

- Describe the purpose and nature of the procedure in detail, to the patient in his/her own language
- Dilate the pupil to about 4 to 5mm, facilitating visualisation of posterior capsule
- No anaesthesia is required
- If a contact lens is used, administer one drop of 2 % Lignocaine to the eye to be treated
- Explain to the patient that there will be some burning sensation due to local anesthetic instillation which is transient
- Allow 2 to 5 minutes for the anaesthesia to act
- Explain to the patient that the procedure will be painless
- Explain to the patient regarding the importance of steady fixation
- Apply 1% aproclonidine five minutes before treatment to stop post - laser spike in IOP
- Ensure full dilatation of pupil
- Adminster 2% xylocaine to the eye to be lasered
- Re emphasise the importance of steady fixation
- Adjust laser table, chinrest and footrest for optimal patient comfort. Keep patient's chin over chin rest
- Application of head strap to maintain forehead position
- Provision of fixation target for fellow eye
- Gently separate the lids (Fig. 5.5).

Fig. 5.5 - Laser treatment

Post-laser treatment

- Topical NSAIDS for 2 weeks
- Follow - up after 2 months
- Explain the method of application and usage of the eye drops
- Emphasis on good control of diabetes mellitus
- Explain the importance of exercise and adherence to diabetic diet to control of diabetes

Student exercise

Answer the following

1. *What are the types of lasers used in Pan-Retinal Photocoagulation?*
2. *What are the steps to be followed in preparing the patient before the treatment session?*

Summary

The above mentioned procedures are done in speciality clinics. The OA should have knowledge about these procedures. The OA has to collect the required equipment and other materials and keep them ready for the technician or the ophthalmologist to conduct the special procedures. The OA must explain the procedure to the patient, the importance of the tests and how the results of the tests will help in diagnosing the disease. The OA plays a very important role in assisting the ophthalmologist. It is the duty of the OA to make the patients feel comfortable and cooperative for the procedures.

Key points to remember

- *After Corneal scraping the doctor will prescribe drops. The OA must explain the method of application of eye drops and the importance of follow up visits.*
- *In FFA the OA has to be alert and ready to face emergencies.*
- *Always assure the patient that the instruments used for testing will not hurt their eye.*
- *The instruments should be covered when not in use.*

CHAPTER 6 MANAGEMENT STRATEGIES IN OUT-PATIENT SERVICES

CONTENTS

Office efficiency and public relations
Patient care and patient satisfaction
Patient counselling
Computer applications in ophthalmic practice

GOALS

To teach the ophthalmic assistant about the ancillary services in the departments or clinics, as well as the basics of working in a clinical setting and using the clinic's computer systems.

OBJECTIVES

The OA will be able to

- Utilise the patient-retrieval system
- Prepare patient charts for a physician's schedule
- Schedule appointments accurately
- Manage critical situations (like when a patient has been waiting for long hours)
- Act as a liaison between the doctor and the patient to maintain a smooth relationship
- Realise that every person is unique and distinct. Avoid stereotyping clients.
- Counsel the patients about their disease, treatment, and facilities available in the hospital and talk about new products and techniques
- Use a computer to perform documentation, retrieval and generate data
- Explain the use of computerised ophthalmologic equipment

CHAPTER 6

Management Strategies in Out-Patient Services

Office efficiency and public relations

The OA not only assists the doctors in the cubicles and in the out-patient procedures and special procedures, but also performs secretarial tasks like staffing, scheduling and bookkeeping as part of their day-to-day duties. The OA helps to decrease the work of the ophthalmologists, so that they will be able to increase their volume of clinical diagnoses and treatment.

Scheduling review appointments

If a follow-up visit is recommended for the patient, schedule the appointment after speaking to the doctor. The date given for each patient's return must be logged in a separate book with date, time, and the name of the patient. The OA should remind the doctor every day about their list of appointments.

Handling the ophthalmologist's schedule

The OA should be efficient in fixing appointment of the patients and sorting the cases for the doctor. They should support the physician in reminding about the appointments of the day; help the doctors in scheduling and in the arrangement of smooth patient flow in the clinic or hospital. The OA should be very tactful and intelligent in handling the patient when the doctor happens to be late or otherwise engaged. To avoid overcrowding, the OA can also reschedule some of the appointments. If the ophthalmologist is going to be away, the OA needs to immediately convey that information to the patient so that the appointment can be rescheduled.

Maintenance of records

The maintenance of medical records in hospitals and clinics is very important because a lot of time can be wasted hunting for misplaced records. The records must be maintained manually, and, if possible, in the computer as well. It is the responsibility of the OA to adhere to the record-keeping system planned by the hospital or clinic. The OA should ensure that all addendum are attached to the main file of a patient so that continuity of treatment is easy.

Claim bills

Some of the patients may require bills and other certificates of fitness to claim leave in their office work. In such situations, the OA should know how to arrange for such bills and get them approved. It is important that the OA never issue false bills to patients.

Handling sales representatives

The sales representatives come to the hospital or clinic to introduce new products from their companies. Some of them frequently visit the clinic, and may even irritate/disturb the doctor. However busy the doctor may be, the medical representatives sometimes wait for hours to try to sell their products. The OA should be clever enough to systemise the patient flow and arrange for the doctor to meet with the sales representatives when necessary. The OA must also be able to explain the patient about the delay.

Staffing

The OA should also be aware of the speed of the patient flow. They must sense when more patients are expected, and when there will be fewer, and plan the staffing accordingly. They must ensure that their staffing planning reduces the patient's waiting time, and must be able to organize the roles of their subordinates so as to have the appropriate manpower required by their department.

Student exercise

- The patient is waiting for several hours with a young child, and the doctor is late due to a major surgery. How will you communicate this to the patient?
- The patient has red eye and asks for emergency appointment in the absence of the doctor. How will you react to the situation?

Out - patient services (OP)

Scope of OP services

- Preventive and promotive services (screening)
- Curative (consultation, investigations, therapeutic procedures, speciality services)
- Follow-up of discharged patient / review visits
- Rehabilitative (physiotherapy, occupational therapy, prosthetics etc.,)
- Counselling
- Health education
- Medical, nursing and paramedical education

The out-patient department is open during set, scheduled hours, and staffing will vary throughout the day depending on the patient load. To provide adequate service, the department should also have a set continuity of supervision to direct the patients to different departments and answer their questions. Competent staffing of the admission and records office will go a long way in establishing and operating a smoothly functioning out-patient department. A workable appointment system and a standardised medical records system must be followed.

Infrastructure in OPD

- The OPD must be easy for patients to navigate. So any symbols (including arrows and numbering) directing the patient to different OP stations must be kept clear and visible.
- Stations like the laboratory, radiology, and pharmacy services should be within the central part of the OPD so that they are easily accessible to the patient.
- While patients are waiting, they are a captive audience, so a waiting room's decor should be utilised to drive home facts about health, including posters, murals, pamphlets, and other display materials.
- The OPD of the various specialties within ophthalmology (like the glaucoma clinic, the cornea clinic, and the paediatric clinic) must be located in the same building.

  Problems in the OPD's functioning that must be rectified immediately

  Prolonged waiting time of the patient because:
- Doctors arrive late or are absent from OPD for prolonged period of time
- Delays in registration
- Delays in the retrieval of medical records
- OP procedures are not streamlined properly
- There is insufficient manpower (especially during peak hours)
- The patient is directed to the wrong stations for consultation
- There is a shortage of critical equipment (slit lamp, ECG, etc.)

Dissatisfaction with amenities

- Insufficient / Unclean toilets.
- Lack of seating accommodation.
- Poor security, theft.
- Absence of female attendant when male doctor is examining lady.
- Poor transport facilities to hospital.

  Strategy for ensuring the effective functioning of the OPD.

Reduce overcrowding and minimize patient waiting time by

- Screening and disposal of minor illness patients by general duty doctors, thus reducing load on speciality clinics.
- Appointment system to spread out the reporting time of patient: either `individual' or `block'

appointments. The block appointment system calls for a certain number of patients to be present at a given time so as to provide a sufficient pool of patients; thus the physician will at no time find himself idle and it limits the pool to the capacity of the waiting room.

- Application of queuing theory modules of operations research whereby the waiting time can be estimated by noting the patient arrival rate per hour, service rate per hour and number of servers. By effective changes in these parameters and in the queue system it is possible to substantially reduce patient waiting time to acceptable levels.
- Synchronize functioning of ancillary facilities with OPD workload such that the laboratory, radiology and pharmacy are open and adequately staffed during peak hours when patients referred from the OPD arrive for these services. Also these departments are to remain open for a longer duration as compared to OPD.

Improve guidance of patients and facilitate easy understanding of hospital procedures and routine:

- Signage boards system, to direct the patient to different departments.
- Effective inquiry and reception services
- Hospital volunteers, guides
- Procedural instructions to be printed on reverse of investigation or requisition slips.

Claim bills

Billing and charges are chief sources of dissatisfaction, especially when:

- Patients are expected to handle the paperwork for their insurance
- Bills are sent before the patient's insurance coverage is determined

The OA should also be able to fill in the claim formats and get it approved by the concern doctors. It is very important that the OA be loyal to the hospital and not issue false bill when a patient will occasionally request them (sometimes patients have spent less money on treatment than they want to claim on their bills to the insurance company).

Student exercise

Answer the following

1. *Explain the facilities that need to be available in the OPD*
2. *Describe the strategy for effective functioning of OPD*

Patient care and patient satisfaction

Hospitals play a vital role in restoring a patient's health, but the OA has to remember that the patient is the customer of the hospital. As such, the success of patient care and the reputation of the hospital depend to a large extent on the efficiency and compassion of the nursing staff. Therefore, ensuring a high standard of care by the nursing staff is vital to the hospital.

Patient care and satisfaction depend in large part on

- High quality nursing care
- High quality out-patient services
- In-patient hospital services
- Physician's services
- Emergency room procedures

Loyalty in hospital relationships

Positive interactions between the patient, the employee, the hospital administrators, and the doctors play a vital role in patient satisfaction.

In time of manpower shortage, high turnover and rising costs, it makes sense to consider how patient's attitudes affect employees. Evidence clearly suggests that health care organisations that enjoy higher level of patient satisfaction also enjoy higher level of employee satisfaction and overall morale.

Unhappy patients tend to become very demanding and critical, making their encounter with their caregivers negative for all parties involved.

Conversely, highly satisfied patients who then praise employees orally or in writing contribute to overall employee satisfaction and to the quality of their life at work.

Patient counselling

Patient counselling should be aimed at establishing a relationship, where in the counsellor is able to help the client to take the proper decision and act on it. The counsellor should aim to help the clients understand themselves better by informing their own needs and increasing their knowledge of the resources available to them.

What makes a good counsellor?

Personal qualities

- Respect for the rights and dignity of other people
- Honesty
- Empathy
- Emotional stability
- Active listening
- Able to keep confidentiality
- Able to express ideas clearly
- Institutional support
- Privacy
- Sufficient time for each session

Arrange for easy accessibility to counselling services

- Supply of needed resources
- Counselling skills and attitude
- Non-judgmental
- Listening skills
- Questioning skills
- Empathy (the ability understand how someone feels without imposing personal values)
- Psychological support (enabling someone to identify and explore their feelings, reactions and emotions; helping them to act on their own initiative)

What makes good counselling?

The six steps of counselling

G - Greet the patient with a smile
A - Ask about their general health condition
T - Tell them about the stage of their disease
H - Help them understand the problem in the right perspective
E - Explain the cause and nature of disease.
R - Reinforce the importance of returning to the hospital for follow-up

Good counselling consists of establishing a trusting and caring relationship with patients and giving relevant, accurate information to help patients to take appropriate decisions. When counsellors are concerned, empathetic, polite and understanding, the patients are satisfied with the health care they receive.

What are the interpersonal skills required for counselling?

Interpersonal skills are the verbal and silent ways that people interact with one another. Those who counsel patients should possess the following communication skills:

- **Active Listening:** Counsellors must listen to what patients say and mean. They also let patients know both verbally and non-verbally that they are listening. For example, rather than going through papers on their desks counsellors should sit facing patients and look at them while they speak.
- **Attentive Behavior:** Counsellors greet patients politely and make them feel comfortable. Facial expressions, eye contact, gestures and posture of counsellor would show patients that they are interested and paying attention.
- **Questioning:** Counsellors ask questions to encourage patients to talk about themselves. These should be questions that cannot be answered with a simple Yes or No.

- **Summarizing and paraphrasing:** By restating in their own words what patients say, counsellors show that they are listening and that they understand. This repetition may also help patients organize their thoughts.
- **Reflecting feelings:** By observing and listening, counsellors could discern how patients feel. Then they tell patients what they think their emotions are. For example, when a patient sounds and acts confused, the counsellor can point out that by saying "you seem confused". This serves three purposes:
- The patient thinks about how they feel and why
- The counsellor finds out whether the client is confused
- If there is confusion the patient and counsellor can clear it up through discussion
- **Giving information:** Counsellors instruct, explain and describe situations simply, clearly and accurately. They use words that patients under stand. They check the patients understanding by asking them to repeat information and instructi ons. If this feedback shows that patients do not understand or remember they explain again.
- **Counselling and health education:** Counselling is not the same as health education, but there are some similarities. Both aim to change behaviours in order to reduce risk; both use two-way interactions between provider and receiver; and both rely heavily on communication skills.

Yet, there are differences in the following respects

Counselling	Health education
Primarily a coping process	Primarily a learning process
Aims to reduce stress by means of dialogue	Aims at dissemination of information via discussion
Usually carried out one-to-one or in small groups	Usually for a mass or group audience
Usually initiated by distressed person	Usually initiated by the educator

Types of counselling needed in an eye hospital

- Preoperative counselling
- Postoperative counselling
- Speciality counselling
- Group counselling (outreach programme)

Who is a good counsellor?

The counsellor should be a competent person with adequate training, experience and continued practice. They should not go beyond their levels of competence and abilities. There should be no hesitation in deciding to refer more difficult cases to those with more expertise in a particular area.

A counsellor should update their knowledge and skills continually. The counsellor's personal feelings, prejudices and biases should not interfere with their work; Cultural, ethnic, religious, linguistic, gender, class and other differences should not interfere with the relationship between the patient and the counsellor.

The spiritual strength of the helper helps a lot as well. Empathy is essential. The uniqueness and dignity of each person has to be appreciated.

In bigger hospitals they may have a separate counselling department. In hospitals where they do not have counsellors, the OA should take the role of a counsellor and counsel the patients. Listening plays very important role in patient care. So, in spite of the crowd in the department or any other reasons, the OA has to give attention to the enquiries of the patients.

Student exercise

Answer the following

1. *What is counselling?*
2. *What are the skills needed for an effective counsellor?*
3. *What are the differences between counselling and health education?*
4. *Mention the different types of counselling needed in an eye hospital.*
5. *Who is a good counsellor?*

Computer applications in ophthalmic practice

The impact of computers in the field of ophthalmology is a reflection of many trends in office automation. Computers have control over many of the instruments in daily office use, such as the telephone, lensometer, kertometer, perimeter, ultrasound, and the copy machine.

Definition of a computer

A computer can be defined as a "device capable of accepting, restoring, retrieving and manipulating or processing information automatically at high speeds by applying a sequence of logical arithmetic or textual operations that follow instructions provided through a prearranged program."

Types of computers

- Digital Computers: Digital computers solve problems that use numbers or symbols by applying rules of logic to arithmetic operations. In hospitals, micro computers are used and are identified by their central processing unit, the amount of memory they have, the capacity of their disk drive, and their operating systems.
- Mainframe Computers: Mainframe computers are large, expensive machines that are able to store enormous amounts of information and to communicate with hundreds if not thousands of individuals simultaneously.

Components of a computer

The physical components of a computer are known as hardware. Computer hardware includes four major computer parts:

- **Central processing unit:** The central processing unit (CPU) is the heart of the computer. It performs logical and mathematic functions as addition and subtraction, as well as comparing numbers or names.
- **Input devices:** The most common computer input device is the keyboard. The mouse is probably the most popular. The mouse is used to manipulate data on the computer screen, move paragraphs around, delete words in word processing and graphics programs, and control the operation of windows programs. Some offices and hospitals use scanners, light pens, touch screens, and bar codes to enter data into the computer and control its operation. OAs can enter the output devices such as an automated lensometer, visual field machine, or corneal mapping devices directly into the computer by using sophisticated circuitry built into these devices.
- **Output devices:** The main output devices of a computer are video display terminals and printers.

Video display terminals

Video display terminals (VDTs), also called monitors, are the operators' main link to the computer. A good monitor with a high-resolution screen is essential to help avoid visual fatigue. If this is a problem, a glare filter can be installed directly over the front of the monitor to reduce glare significantly and thereby increase operator comfort. Colour monitors are the accepted standard for most ophthalmic offices. Although somewhat more expensive than monochrome (green or yellow) monitors, colour monitors can significantly increase operator efficiency by calling attention important details in a patient's record through the discriminating use of different colours.

- Printers: Printers are available in several varieties:
- Daisy wheel, such as that in most electric typewriters
- Dot-matrix, which uses a series of very small dots to form characters
- Ink-jet printers, which use a small ink cartridge to print with
- Laser printers, which use the same technology as a copy machine to produce an image on the paper. There are significant differences in speed, quality of output, and noise among the various types of printers.

- **Storage devices:** The last part of the computer is memory. Information entered into the computer needs to be stored for later use. Information in the random access memory (RAM) can be accessed by the CPU in a few microseconds. RAM has the significant disadvantage of being volatile; if the computer loses power for even an instant, the information could be lost. To store information permanently, it is written to a hard drive, which can hold information for later retrieval.

It is critical that hard drives are regularly backed up. This can be done using diskettes or cassette tapes. These tapes are capable of storing several gigabytes of information. They are crucial for restoring lost data if the computer crashes.

Use of computers in ophthalmology

1. Software applications: A computer can perform a variety of tasks in an ophthalmic office, including billing patients, scheduling appointments, keeping medical records etc. computers aid physicians in managing their finances, writing journal articles, or doing literature searches.

Billing: Accounts receivable software allows a hospital to easily prepare bills, convert codes for services into statements, and produce reminder letter for delinquent accounts and analyze accounts and referral sources.

Medical records: Most hospitals have their medical records computerized. The physician or a data entry professional types the patient's medical records directly into the computer as the patient is examined. Advantages of computerizing the medical record include better legibility, no lost records, less paper and clutter around the office, and usually better patient care. Computerized medical records also make it possible to automate clinical data research inasmuch as all records have been stored on the computer, to find and correlate disease entities, and even to critique the quality of care given. Once the patient record is entered into the computer, consultation letters can be automatically sent to referring ophthalmologists. In addition, research reports can be printed to inform pharmaceutical and contact lens companies about patients who are eligible for studies or research projects, and these companies can track the progress of the ongoing clinical research studies.

Management reports: The main reward of computerizing a medical office is that of more efficient use of the data collected daily in the hospitals, such as patient names, diagnosis, place, referring sources and procedures done. These computers make it possible for the office manager to easily determine where patients are coming from, whether a marketing program is successful, and how well office costs are being controlled.

Appointment scheduling: Larger practices with several hospitals and ophthalmologists find it necessary to utilize computers' ability to centralize appointment scheduling. The computer can be programmed to produce patient reminders; keep clinical records; keep track of drugs or contact lenses; notify office personnel of patients' reminders; keep clinical records; keep track of drugs or contact lenses; and notify office personnel of patients who repeatedly miss appointments. Computers also can call attention to patients who are receiving critically needed drugs and fail to return for routine follow-up visits.

2. Computer-controlled ophthalmologic equipment

Visual field testers: Automated visual field testers are now controlled by the use of computers. The order and size of stimuli presented, the timing, and even the monitoring of patient eye movement are controlled by a small computer present in the perimeter. Results of periodic testing are computer-analyzed, with small differences in the test results being quantified to identify disease progression. Perimetric test results are stored on disks for storage and analysis in both the humphrey and octopus perimeters.

Automated refractors: Small computers inside automated refractor control the placement of the infrared-sensing beam that maintains correct placement of the light source. The computers then carefully analyze the readings, and an accurate reading of the patient's refractive status is ready within a few seconds.

Automated keratometers: Keratometry is the measurement of the shape of the cornea. A number of instruments calculate this information automatically using microcomputers. In addition, corneal topographic measurements, as obtained by the photokeratoscope, can be analyzed and stored with the use of sophisticated computer programs.

Ultrasound: Microprocessor-controlled ultrasound equipment is used to determine the length of the eye for intraocular lens. It also can be used to measure reflectance echoes of intraocular tumors to determine type, size and location. The original A-scan equipment required the use of an oscilloscope, but today's computer-controlled equipment takes hundreds ofmeasurements, discard erroneous values and providing the ophthalmologist with an accurate measurement of globe length.

Automated lensometer: Lensometry, the measurement of eyeglasses, can now be done automatically. The Humphrey Lens Analyzer, for example, makes many measurements of the deviation of the light beam as it passes through a lens being measured. Multiple calculations are done by a small microprocessor in the lens analyzer to give the final accurate reading of sphere, cylinder, axis and prism of the lens.

Corneal topographic analyzer: The placido disk has been used to determine corneal shape for many years. It is used in automated keratometers to establish the shape of the cornea and the amount of corneal astigmatism.

Summary

In this unit, the emphasis is on how an OA can effectively play the role of an office assistant and help the doctor in scheduling his appointments and handling his mail and the patients. The OA has learned how to plan according to the flow of the patients, and to counsel patients about their disease. Computer skills help to store necessary data quickly and could use it for future reference.

Student exercise

I. Choose the correct answer

1. *Which is not of use for a medical computer?*
   a. Billing systems *b. Word processors*
   c. Patient records *d. Game challenges*
   e. Autoperimeter
2. *Which is not a computer – controlled ophthalmologic equipment?*
   a. Auto refractometer *b. Auto lensometer*
   c. A-scan *d. B-scan*

II. Fill in the blanks

1. *The physical components of a computer are called__________*
2. *Video display terminals also called ________ are the operator's main link to the computer.*
3. *The two main output devices of a computer are __________*
4. *An instrument that automatically measures the corneal curvature and provides a printout of the dioptric power of the cornea is called a____*

III. Write true or false

1. *Ophthalmologic equipment may be run by a computer*
2. *A printout of a result obtained from ophthalmologic equipment is a computerized act*
3. *The most common output device is keyboard*
4. *Automated visual field testers are now controlled by the use of computers*
5. *Ink-jet printers use a series of very small dots to form characters*

IV. Answer the following questions

1. *What are the major advantages of computerizing in an ophthalmic hospital?*
2. *What are the major uses of computers in an ophthalmic practice?*
3. *List how computers can help the OA in an ophthalmic practice?*
4. *How does a computer work in an auto lensometer?*
5. *What types of printers are available for computers?*

CHAPTER 7 ORIENTATION TO IN-PATIENT SERVICES

CONTENTS

Differences between eye ward and general ward
Location and working environment in ward
Instruments and equipment in ward

GOALS

The ophthalmic assistant will understand the location of ward and the differences between the eye ward and general ward.

OBJECTIVES

The OA will be able to

- Understand the differences between the eye ward and general ward
- Classify the beds and sections
- List the name of each instrument and equipment
- Explain the purpose of each instrument and equipment
- Explain the usage and maintenance of instruments and equipment

CHAPTER 7
Orientation to In-Patient Services

Ward is considered to be the central hub of a hospital. It is the only place where patients are with the hospital staff for a long duration and this necessitates rendering patient care at high standards so that patient satisfaction can be arrived at. This, as a result, will end up serving as a bridge between hospital and community in creating awareness.

Many of the ophthalmic surgeries are done on a day care basis in the recent days.. Still, in some countries where patients come from distant places seek admission for a day or two. Patients with systemic problems are also hospitalized for eye surgeries. So, OAs are to be familiar with ward procedures.

Preoperative and postoperative care is a critical component of nursing and preoperative care determines the patient's state of mind before surgery and attitude towards the hospital. OAs in the wards are responsible for ensuring continuity of ophthalmic care before and after surgery, and for providing physical and psychological support to patients during their stay.

In each ward, there is a nursing unit to take care of the patients for 24 hours. The OAs are fully in charge of the patients from the time they are admitted until they are discharged. Basic nursing care consists of helping the patient to carry out those health maintaining functions which he is unable to provide for himself.

The majority of ophthalmic patients are able to look after their own personal hygiene. However, occasionally a patient may become ill while in the hospital and require basic nursing care.

Differences between eye ward and general ward

The Ophthalmic ward is different from the general hospital ward or a multi specialty ward. General emergencies occur less often in the ophthalmic ward. The infection rate is very minimal compared to multi specialty ward, except for cases with ocular and orbital infections which will be isolated from the other wards. Hence, the nasocomial infections will be lessened.

The OA will be able to manage normal situations and seek the advice of physician / ophthalmologist for high risk and ocular emergencies.

The patient will be able to manage themselves for a day or two after surgery in the ophthalmic ward and hence the number of attendants / visitors will be less than in the multi specialty ward. The stay of patients in the ophthalmic ward will be shorter than that of the multi specialty ward.

Skills of ophthalmic assistants in the wards

The OA in the wards requires compassionate and thoughtful care for patients, and accuracy of judgment and manual dexterity when treating the eye.

Ward OA also requires

1. Experience in preoperative preparation (dispensing medications, liaison with general physician in case of systemic disorders)
2. Experience in postoperative care (dispensing medications, application of dressings, examination for postoperative complications)
3. Ability to identify postoperative complications early and notify the attending doctor.
4. Ability to identify general emergencies and assist in crisis.
5. Pre and post operative counselling skills
6. Knowledge of safe administration of medication
7. Understanding of aseptic technique
8. Skill in bed making
9. Understanding how to care for the visually impaired
10. Communication skills

Location and working environment in ward

Inpatient ward should be away from the out-patient department. The ward can have a different entry so that it will be easy for the patients and their visitors to move around. At the entrance of the hospital i.e. near the admission and discharge counter, the stairs and elevators should be located which will provide the path to the wards. It should be easy to identify the ward and accessible to patients.

At the entrance of the ward the OAs should be allotted space to keep a computer, telephone, other necessary materials, and a wash basin to wash their hands thoroughly. This is called nurses' station. (Fig. 7.1) Opposite to this, there is the examination room with a slit lamp. In this room the ophthalmologist checks the patients before and after surgery.

Fig. 7.1 - Nurses' station

The OA keeps all the necessary equipment and materials in this room. As the patients enter the ward they are to be received by the OA in the nursing station and after necessary registration, they are guided to the room allotted to them. Near the nursing station a notice board is kept which displays the following details.

Total number of beds available in each type of room

Number of beds occupied

Name of the duty doctor

Knowledge of ward setup

- Departmental structure
- Duty doctors

Ward-in-charge

Senior OA	Support services
Sub senior OA	House keepers
Junior OA (trainee)	
Sub -junior OA (trainee)	Electrician
Ward counsellor	Plumber
	Cleaners

Classification of rooms

- The rooms can be classified depending on the hospital structure and facilities. For example,
- Luxury room - large A/C room with facilities for attendant (Fig. 7.3).

Fig. 7.3

Fig. 7.3a

- Private with attached bathroom (Fig. 7.3a)
- Private with shared bathrooms (Fig. 7.3b)
- General ward (Fig. 7.3c)
  - Free ward and also by classification of cases :
  - Clear cases
  - Septic cases

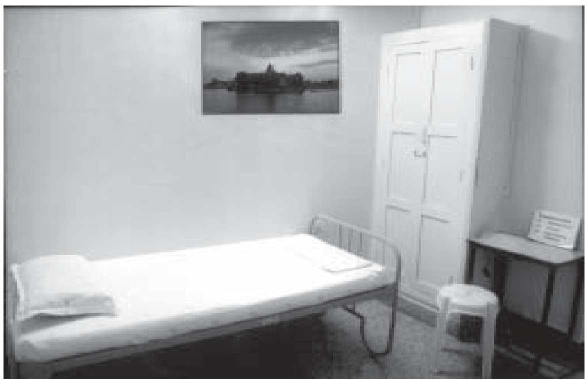


Fig. 7.3b

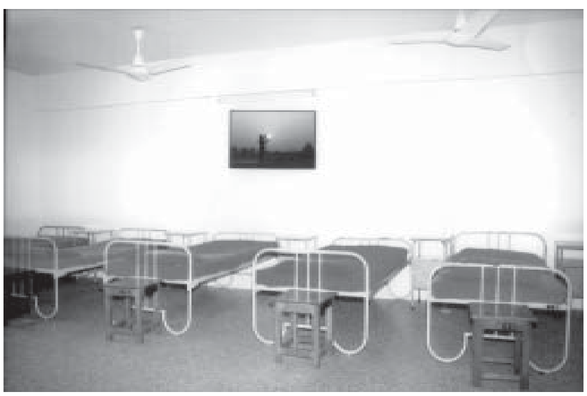


Fig. 7.3c

Admission procedure

When the patient is ready to undergo surgery, the patient is counselled in the respective clinics or in the general counselling department.

The patient gives consent for surgery at the time of admission. The inpatient record, continuation sheet and operation notes are attached to the patient's case sheet. The patient is assigned a room at the admission counter.

The patients are sent to the respective ward duty room along with their case sheets.

- In the ward, the OA enters the details of patient in the admission register and give the patient the assigned room key. The OA guides the patient to the room.
- The patient is given a medical prescription and is sent for other required tests or procedures, according to the type of surgery.
- Instructions for taking medicine are given by the ward OA.
- Preoperative counselling is done on the day before the surgery.
- After surgery, the ward OA visits every postoperative patient, gives instructions, and answers any questions.
- The ward counsellor or the OA in the respective floor provides postoperative counselling.

Instruments and equipment

The quality and efficiency of medical services provided in any hospital depend on the proper functioning of the equipment and instruments used by the doctors and other clinical staff. Even under normal and careful use, instruments may fail to function properly. The frequency of such failures can be considerably reduced by proper care, maintenance and timely repair.

In ophthalmology there has been a major increase in the use of sophisticated instruments and equipment during the last decade. This has led to a higher quality of eye care services and better patient satisfaction.

Ward instruments and equipment

Instrument

S.No.	Particulars
1.	Dressing trolley
2.	Dressing bin (large – stainless steel) is used to keep sterile dressing
3.	Dressing box
4.	Medicine tray
5.	Kidney tray (steel and plastic)for irrigating the eye

6. Eye lash cutting tray
7. Aluminium tray (for urine examination)
8. Scissors
9. Scissors Box (small)
10. Artery clamp
11. Cidex box
12. Saline box
13. Bandage box
14. Chitles forceps-to carry sterile items
15. Suture removal forceps-to remove the sutures
16. Lid retractor-to retract the lid for examination of the eye in oedematous lids
17. Drop opener
18. Urinal can
19. Bed pan
20. Silver basin with cover
21. Hot water drum
22. Tray for placing case sheets furniture

Furniture

S.No.	Particulars
1.	Wheelchair
2.	Computer table
3.	Steel cupboard
4.	Chairs
5.	Foot stool
6.	Waste bucket
7.	Examination table
8.	Cot

Linen

S.No	Particulars
1.	Mattress
2.	Mat
3.	Pillow
4.	Pillow cover
5.	Bed sheet
6.	Hand towel
7.	Table cloth

Equipment

S.no	Particulars
1.	Blood pressure apparatus- to measure the blood pressure of the patient
2.	Stethescope
3.	Ophthalmoscope-for fundus examination
4.	Tonometer-to measure intraocular pressure
5.	Gonioscope-to examine the angle
6.	Slit lamp with cover-for anterior segment examination
7.	Oxygen cylinder with cover
8.	Torch
9.	Saline stand

Summary

A ward is that area of the hospital where all the amenities – physical, social and especially medical care – are made available to help the patients feel at home until they are discharged. It must be isolated from all OP units. The cleanliness and housekeeping of the ward are most important to avoid nasocomial infections.

The patient must be informed of all the facilities of the hospital so that they can choose as per their financial status. The equipment and instruments must be maintained properly and sterilized to avoid infections.

Key points to remember

- *Handle the instruments carefully*
- *Patients with infection should be isolated*

- *Clear communication should be given to patients*
- *All the facilities of the hospital must be clearly explained to the patient*

Student exercise

Fill in the blanks

1. *------------ is used to clean the eye with an antiseptic.*
2. *---------------------- is used for fundus examination.*
3. *To irrigate the eye ------------------------ is used.*
4. *Gauze and pads are kept in ------------------------.*
5. *Patients with --------------------- should be isolated.*

Answer the following

1. *Write a paragraph about the ward orientation.*
2. *Mention the details displayed on the ward notice board and their importance.*
3. *Draw the ward flow chart.*
4. *Discuss the differences between the eye ward and general ward.*
5. *Show the equipment to each other. Identify them and state their use.*

CHAPTER 8 PERSONAL CARE OF PATIENTS

CONTENTS

Admission Procedure
Arrangement of patient's room
- Bed making
- House keeping

Discharge Procedure

GOALS

To equip the ophthalmic assistant to adopt proper admission and discharge procedures in the ward and execute the tasks effectively.

OBJECTIVES

The OA will be able to
- Analyse different types of admission procedures
- Learn hospital routines and procedures relating to admission, transfer, and discharge of patients
- Explain the procedure to the patient
- Know how to assist in admitting, transferring patient, and discharging patient
- Provide patient's rooms with proper housekeeping arrangements
- Recognise and manage the emotional reactions of patients
- Arrange admission and discharge without any overlapping of situations
- Document the admission and discharge details

CHAPTER 8

Personal Care of Patients

Patients admitted will be agitated before surgery. The ward will have different types of patients with different backgrounds and it is a challenge for the OA to take care of them, to counsel them and discharge them as a satisfied patient.

Admission procedure

Types of admission

1. Emergency admission
2. Planned admission on the basis of note from the admitting consultant
3. OPD patient requiring immediate admission
4. Telephonic reservation for admission

Admission timings

The timing of admission and surgery may vary from place to place according to the system followed by hospitals.

Admission procedure

A patient is admitted in the hospital on the basis of the written note from the medical officer or physician.

Admission involves the following procedure

In the counselling department, the counsellors explain to them about the disease, type of surgery suggested by the doctor, types of rooms and the facilities available in each type of room and their charges, hospital facilities and charges for the various services to patients and relatives.

If the patient shows willingness to get admitted, they are sent to the admission counter. In hospitals where they do not have separate provisions for an admission counter, the reception counter could be used for the procedure.

At the admission counter, preparation of admission record which will contain name, address, sex, age, admission date, bed number, admission no. medical record number is to be recorded. If a computer is available the details could be computerised. Otherwise all the details are to be legibly written.

To cash paying patients, a receipt should be immediately issued. Patients, for whom the payment will be made by corporate offices, need not be given any receipt.

Patient's medical record (case sheet) is sent along with the patient. In bigger hospitals, junior OA could be utilized to guide the patients to the respective wards.

The ward OA is to receive the patients and enter their names in the admission register.

The ward OA can guide the patient and the attendar to their respective rooms and give them instructions about the facilities in the room. For example, if there is provision for hot water only during stipulated time, it could be informed. In general wards, there will be provision for common bath rooms, and they are shown the location of the lavatory and the bath rooms. The occupants of single rooms are given the room lock and key. If the patient or the attendant asks for any clarifications, the OA must answer cordially and leave the room.

After giving instructions about the drops to be instilled before surgery, the OA tells them the number of times the drop is to be instilled. The patients are likely to use the drops in both eyes, so instruct them that they need to instil drops only in the eye to be operated.

Even if the patient asks a number of questions, they should be answered politely. Sometimes they may ask the same questions repeatedly for which clear answers should be given by the OA.

Information is given about the visiting time of the ward doctor to the patient and the attender. Inform them that OA can be approached anytime for help.

It is the duty of the OA to make the patient's stay comfortable.

Arrangement of patients room

Bed making

Skilled bed making is absolutely essential in helping to prevent cross infection. Movement of the bedclothes dislodges microorganisms from the bed into the air. Bed making should be carried out using smooth movements to avoid unnecessary disturbance of the air above the bed, minimizing microorganisms that may be airborne. All the materials required should be available at the bedside before stripping the bed. Bedclothes should be stripped on to a chair placed at the foot of the bed. Care should be taken to prevent the bedclothes from dragging on the floor, picking up microorganisms. Removal of debris from the sheets and straightening out any creases is necessary (Fig. 8.1).

Fig. 8.1 - Bed making

Materials for bed making

The required material for bed making is to be kept ready

Bottom sheets, pillow cover, top sheet, cleaning cloth, soap dish with soap, hand towel, laundry bag, any disinfectant.

Procedure

- Take clean bed sheets and clean pillow covers.
- Knock on the patient's door and politely ask permission to enter and make the bed.
- Make polite enquiries about the patient's health, and say a few comforting words.
- Help the patient to get up from the bed and sit on the chair.
- Remove the outer cover of the pillow.
- If the inner cover is clean, do not remove it. Otherwise remove the inner cover also.
- Remove the used sheet from the bed gently and carefully by folding it into four, so that the dust does not fly around. Place this along with the pillow covers with the dirty linen outside the room.

Spreading a clean bed sheet

Method

- Fold the mattress into two and wipe the dust under the mattress with a wet cloth
- Wipe the bed thoroughly with a dry cloth. A damp bed will cause the mattress to smell
- Dust and clean the legs and the portion under the bed in a similar manner
- Make sure that the bed sheet has no stains and is not torn
- Fold it uniformly and place it in the centre of the bed
- Spread the mattress breadth wise on the bed, and tuck one end of the bed sheet under the mattress
- In a similar manner tuck the opposite end. Make sure that there are no creases in the bed sheet after it is so tucked
- The four corners of the bed sheet which remain unfolded should be mitred. To mitre a corner, tuck in along the foot or the head of the mattress, lift the flap of the sheet from a point along the side about 30cm from the corner and tuck in the remaining portion. Now drop the flap and tuck in

- Tuck in the sides along the length of the bed
- Pat the bed sheet all over to remove any crease
- Inspect the work. There should be no creases or folds

Putting on a pillow cover

Method

- Change the inner cover only if it is dirty.
- Fold the pillow in two and then slip it into the cover.
- Let the knot of the inner cover go in first so it is not visible once the outer cover is put on.
- The opening of the pillow cover should not be visible.

Arranging the bed

- Place the pillow at the head of the bed.
- After the bed sheet has been neatly spread and the pillow cover has been put on, fold the additional sheet neatly and put it at the foot of the bed.
- Settle the patient comfortably on the bed again, thank, and then leave the room.

Housekeeping

Housekeeping department is responsible for cleanliness, maintenance and aesthetic upkeep of the hospital, to provide a safe, pleasant and infection free environment to the patients. The department activities cover all patient and non-patient areas inclusive of external premises of the hospital.

Procedure for linen

Linen and laundry is the responsibility of the Housekeeping department. The total control and maintenance of linen in the patient areas and consultation rooms is taken care of by linen section. Budgeting, indenting and condemnation of linen is done by the linen in charge. In some hospitals washing of all patient linen and guest laundry is taken care of by the in-house laundry. Issuing of fresh linen to the respective areas is done by the linen section.

Steps to be followed for corbolisation

- This is done in the areas where fumigation is not possible
- Wear mask and pair of gloves
- Switch off the AC and fan
- Remove the soiled linen and fresh linen from the room
- Mix the disinfectant with hot water.
- Thoroughly dust the mattress, cot, couch, cupboard, water jug, glass, foot stool, food trolley, ceiling fan/AC grills, using the hot disinfectant
- Sponge mop the walls with disinfectant
- Sweep and mop the floor with disinfectant
- Put back all things in their appropriate places.
- Make the bed and replace the required linen items/toiletries
- Switch on the AC
- Check the room on completion of the task.

Steps to be followed for fumigation

- Wear gloves and face mask as a precautionary measure
- Leave all items in the room undisturbed
- Seal all outlets for leakage except for the main door
- Pour concentrated solution of formalin on cotton placed on a plastic sheet inside the room
- Seal the main door immediately from outside
- Keep the room sealed for twenty four hours and then clean

Waste disposal

Waste disposal plays a very important role in ward. It is carried out in a very systematic and hygienic manner Fig 8.2.

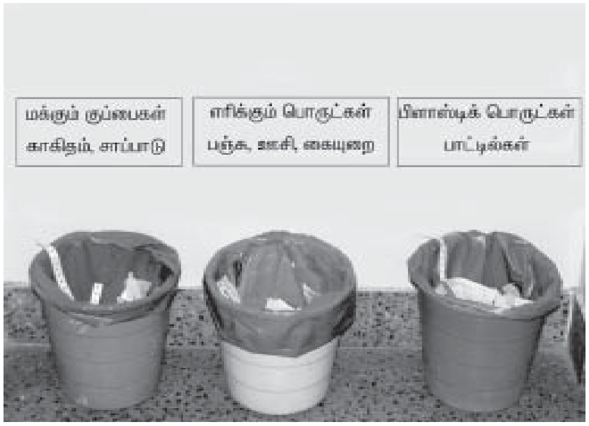


Fig. 8.2 - Different coloured bins

Colour coding

Different color bins are used to collect waste.

It helps to dispose it easily. For example the under mentioned color scheme is used.

Red color Bin

a. Needles: (draw a tabular column and insert the details)
b. Scalpel blades
c. Broken ampules
d. IV tubes
e. IV lines
f. Syringes
g. Dressing materials like gauze, cotton etc

Yellow color bin

a. Above said items without blood stain

Blue color bin

a. IV fluid bottles
b. Glass vials
c. Glass bottles

Black color bin

a. Cytotoxic drugs
b. Expired drugs

White color bin

a. Household waste
b. Food waste

Waste generation and collection

The waste generated in hospital is classified into 5 categories, these are

1. **Anatomical waste:** The anatomical waste is collected in red bags: these are mainly generated in operation theatres.
2. **Clinical waste:** The clinical waste such as plastics and catheters are to be collected in blue bags
3. **Contaminated waste:** The contaminated waste such as blood - stained cotton, gauze, bandage, needles, syringes etc. are to be collected in yellow bags from respective areas in the hospital.
4. **House hold waste:** household waste such as paper, stationary, tea cups etc. are to be collected in white bags.
5. **Food waste:** The food waste is to be collected in bins.

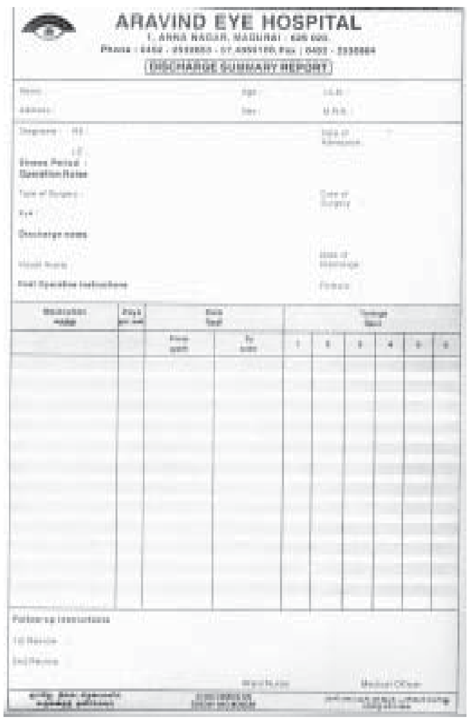
Other types of waste are assembled in bulk and given to a contractor for disposal

Discharge procedure

On the day of surgery, (prior to the day of discharge) the duty doctor examines the patients in the ward. If there are no complications, the patient is advised for discharge on the following day after examination by the ophthalmologist. If the patient has any complication, as per the instruction of the ophthalmologist the stay of the patient has to be extended.

The ward OA will inform patients who are to be discharged the following day, and they will do the discharge counselling by giving postoperative instructions regarding use of eye drops, medicines, do's and don'ts after surgery and also fix up review date according to the convenience of patients.

On the day of discharge, the first step in the morning is post operative vision check followed by dilatation. The senior medical officer will finally examine and discharge the patients who have no complications. For those advised for discharge, the case sheets are made ready and is handed over to the admission and discharge counter after which the patients are asked to settle their bills. In the meantime discharge summary is prepared by the ophthalmologist of the ward (Fig. 8.3).


ARAVIND EYE HOSPITAL

DISCHARGE SUMMARY REPORT

Fig. 8.3 - Discharge summary report

The discharge summary is handed over to patients reminding them about the review date. The ward OA should insist on the importance of review to the patient. Medical certificatesoreimbursement certificates, are issued at the ward station. Employees of any organisation may need a medical certificate to avail leave from the organisation, so the OA should make arrangements for them to get the certificate without delay.

The OA who is in charge of issuing these certificates should prepare them meticulously without committing any mistakes.

Summary

The admission and discharge procedures should be very smooth. There should be coordination between the ward OA and the medical record staff. In smaller hospitals there may not be a separate medical record department. One person has to be in charge of the admission and discharge procedure who can communicate with the ward OA about the status of the rooms available. A proper system should be followed according to the flow of patients, and the patients should not face any inconvenience in the admission and discharge procedure. Admission and discharge timing could be fixed according to the administrative convenience of the hospital.

Points to remember

- *Receive the patients with a smiling face*
- *Enter the name, M.R. number, room number, type of surgery in a register*
- *Guide them to their room and give necessary instructions*
- *Make their stay a comfortable one*
- *Inform the time of surgery*
- *Inform the day and time of discharge*
- *Always check the order for admission, discharge and preparation*

Student exercise

Write short notes on

a. *Bed making in an occupied room*

b. *Fumigation*

c. *Toilet cleaning*

Answer the following

1. *List the four types of admission*
2. *Write about waste collection in the ward*
3. *What items are collected in the blue color bin for disposal?*
4. *Draw the flow chart for discharge procedure*

CHAPTER 9 PREOPERATIVE OPHTHALMIC NURSING CARE

CONTENTS

Preoperative evaluation
Day care surgery procedure

GOALS

Ophthalmic Assistant will learn the preoperative evaluation and preparation

OBJECTIVES

The OA will be able to

- List the steps taken before surgery
- Record the results of various tests
- Explain the day care procedures
- Describe the patients who are suitable for day care

CHAPTER 9

Preoperative Ophthalmic Nursing Care

Preoperative evaluation

Once the patient has been admitted to the ward for surgery or treatment, as per the instructions in the case sheet, the OA is to do the necessary tests and record them in the case sheet. The following tests are conducted prior to the intra ocular/ cataract surgery.

A.Ocular examination

i. Visual acuity

Vision should be tested with and without glasses and with pinhole. In advanced and mature cataract, perception and projection of light should be tested in the entire four quadrants to rule out retinal problems.

ii. Refraction

Both the eyes should be refracted. If the extent of cataract does not correspond to the visual loss, posterior segment pathology should be ruled out by special tests. In such cases the possibility of poor prognosis is explained to the patient before the surgery.

iii. Intraocular pressure (IOP)

The tension must be normal. If the tension is raised due to glaucoma the tension has to be lowered either by operation or by medication. The IOP has to be normal before cataract surgery. Usually lOP is tested by Schiotz tonometer/non contact tonometer in both eyes. In borderline and raised lOP, differential tonometry and applanation tonometry are done.

iv. Syringing

Patency of nasolacrimal duct should be tested. If the duct is partially free with clear fluid, hourly antibiotic drops are started and conjunctival swab is taken for culture and sensitivity. The operation is performed only after the culture shows no growth. If duct is not free, with mucus or purulent discharge, Dacryocystorhinostomy / Dacryocystectomy is to be done and cataract surgery can be done after one month.

v. A-scan, K-reading prior to cataract surgery

It is essential in case of IOL surgery. It gives the power of planoconvex IOL and +2 is added to this for biconvex IOL. In case of scarred cornea and irregular surface of cornea, the K reading will not be possible. In this case the other eye should be taken into consideration.

vi. Random blood sugar (RBS)

Random blood sugar test is compulsory for all cataract patients to ensure that they are not diabetic. Normal random blood sugar value is below 160mgs. If the patient's blood sugar is raised, additional test (fasting blood sugar and post prandial blood sugar) is done.

B. General examination

Common systemic problems like diabetes, hypertension, and ischemic heart disease should be under control before surgery. Physician fitness is required in such cases prior to surgery.

i. Blood sugar evaluation

In diabetic patients, fasting and post prandial blood sugar evaluation is done. Diabetes should be well under control, and if not controlled, physician's opinion must be taken and treatment added according to the doctor's advice. On the day of operation, anti-diabetic treatment should be avoided to prevent hypoglycemia. (In uncontrolled diabetes, there is a chance of post-operative infection and delayed wound healing and the pupil is difficult to dilate).

ii. Blood pressure recording

In the presence of hypertension, blood pressure must be reduced to systolic 170mm of Hg and diastolic 100 mm of Hg. If surgery is done in uncontrolled hypertension, there is a grave risk of expulsive hemorrhage immediately after the section is made for cataract surgery.

If B.P is not controlled, physician's opinion is taken, important investigations like blood urea, serum creatinine and serum cholesterol may be done and treatment started according to the physician's advice. Cataract surgery can be safely done with diastolic blood pressure under 100 mm Hg. In these patients, phenylephrine and adrenaline should be avoided and pupil dilatation is achieved with cyclopentolate and tropicamide.

iii. Cardiac evaluation

Every cardiac patient should have fresh ECG . Surgery should be performed only after six months of the previous attack of IHD or MI. Here again adrenaline and phenylephrine should be avoided and surgery has to be done with cardiac monitoring.

iv. Asthma

In asthmatic patients, chest auscultation should be done for the presence of rhonchi. Patients should continue the anti asthmatic treatment. An injection of Broncho dilator before surgery can be given to make the patient comfortable on the operation table.

v. Renal failure and renal transplantation

Blood urea and serum creatine tests results are obtained.

vi. Allergic conditions

If the patient has any history of medicinal allergy, a xylocaine test dose has to be given before giving local anaesthesia.Hence it is mandatory to get the information from the patient and record it in the case sheet.

vii. For paediatric patients

Hemoglobin and urine sugar should be tested. The anesthetist's opinion is also needed. If the child has cough or cold the surgery should be postponed.

Hemoglobin, bleeding time, clotting time, blood group should be investigated for the patients with DCR, enucleation and evisceration.

The above mentioned tests are performed and recorded in the case sheet of the patient. The OA in the ward has to meticulously check whether all the necessary tests have been conducted and give instructions to the patient.

C. Assisting the doctor in examining patients

In the ward, the ward OA is to give the doctors all the details about the patients. The doctor checks the patient in the slit lamp and records the findings. The OA assists the doctor in all the procedures. The OA has to adhere to the instructions given by the doctor.

On the day of the surgery the OA has to clean the outside area of the eye with iodine. Ask the patients to relax and inform them of the time they are to be ready for the surgery. Counsel the patients to have no fear about the surgery. Ensure them that the OA will be there to help them at any time. The OA should instil a confidence to face the surgery.

Preoperative counselling

- Depending on the patient's emotional state and their situation counselling should be given.
- Knowledge of the patient should be analyzed to know whether there is an awareness of the surgery.
- The patients should be told about the nature of the disease, the treatment procedure and surgical method, type of anesthesia (retrobulbar, facial, topical).
- Duration of their stay, date and timing of the surgery should be informed.

- Duration of the surgery need not be informed. Sometimes the surgery may take longer time than planned and this may create unnecessary anxiety to the patient and also the attendant.
- Importance of the surgery, the complications and positive results should be explained to the patients.
- If the patient has fear to undergo the surgery, then a role model patient who had successfully completed the surgery can demonstrate or share their positive experience
- The facilities provided by the hospital should be clearly explained

A. Preoperative preparation for retina surgery

- The patient is admitted to the hospital the day before surgery
- Eyelash cutting is done by the OA
- Antibiotic drops are given once an hour, six times prior to surgery
- Patients above 40 years will be tested for blood sugar, blood urea, serum creatine, urine albumin, ECG
- Oral antibiotics should be started for patients with intraocular foreign body and infection
- Physician fitness must be obtained prior to surgery

B. Paediatric preoperative preparation

- Check the case sheet for details regarding completion of investigations and indication of type of surgery, eye to be operated, operating surgeon, time of surgery
- Ensure completion of investigations regarding administration of general anesthesia e.g B.P, urine sugar, hemoglobin percentage, 'A' Scan, keratometry for paediatric cataract
- In cases of systemic problems it is necessary to get either the Paediatrician or the Physician opinion prior to surgery
- Note the general condition of the child. Look for upper respiratory tract infection in children Patient should undergo assessment by the anesthetist
- Confirm the time of surgery and duration of starvation
- Preoperative application of antibiotics on the previous day, dilating drops in cases of cataract on the day of operation is mandatory

i. Preparation of patient and the parents on the day of surgery

- Take them to the operating room at the specified time
- Hand over the case records to the nurse in the preoperative waiting room
- Schedule the patients in cooperation with the nurse according to the list on that day

ii. Paediatric preoperative Counselling

- Depending on the emotional state of the patient's parents' and their situation counselling should be given.
- The patient's parents should be told the nature of the disease, (cataract / squint) the treatment procedure and surgical method. The choice of the lens and the surgery type is totally dependent on the parents decision.
- Duration of their stay, date and timing of the surgery should be told.
- Duration of the surgery should be told.
- The facilities provided by the hospital should be clearly explained.
- Importance of the surgery, the complications and positive results should be explained to the patient's parents.

C. Preoperative counselling for orbit surgery

- Confirm the time of surgery and duration of starvation for the pediatric patients and patient undergoing general anesthesia.

- Bath can be taken. Heavy food should be avoided. In diabetic patients test report of fasting blood sugar is requested.
- Appropriate instructions have to be given to patients with systemic diseases.They have to take their medications as to continue their routine medication for B.P, asthma, diabetes and cardiac diseases. Certain medicines like aspirin should not be taken for two to three days before and after surgery.

Day care surgery procedure

In recent years due to the advancement in medical technology, most of the ophthalmic surgeries are done as day care. In day care surgery the patients need not stay in hospital. All cataract surgeries can not be done as a day care procedure. Patients with systemic diseases like cardiac, hypertension, diabetes, asthma and very elderly patients have to stay in the hospital before and after surgery. Patients from far off places also prefer to stay in the hospital to avoid traveling long distances. Patients without any systemic problem and who reside near the hospital area could utilize day care facilities.

If the patient accepts surgery and if they are from in and around the hospital area and have no systemic problems then check the willingness for daycare. If the patient agrees to it, and then the patient is given all the instructions. If the hospital has a separate counselling department, the counsellors can be given the responsibility of informing the patients about day care procedure. In smaller hospitals the OA has to give the instructions.

Surgery is done in the theatre and adjacent to the theatre, there is a nursing station. The patient is guided to the place. At the nursing station the case sheets are received and prescription slip is given based on surgery type. The patient is directed towards the pharmacy. After purchasing the medicines the patients are given instructions about how to use the preoperative medicines. They are given a day care card and are asked to bring their day care card on surgery day. On the day of surgery, patients are directed to the day care room after verifying their day care card. In the day care room the OA will check whether the eye is properly dilated. If not, dilatation drops are applied. Following that the patient waits for sometime.

The OA will also verify the blood sugar and blood pressure of patients and their fitness certificate. If everything is under control, patients are directed to the operation theatre. Surgery is performed at the scheduled time. After the surgery, patients are led to the daycare room. There the patients are told about postoperative care and are asked to come on the following day for postoperative review. On the day after surgery the patient undergoes final examination and review date will be fixed up in consultation with the patient.

Summary

In this unit we have covered the necessary tests conducted and the relevance of them and how to prepare the patient for surgery.

Key points to remember

1. *From the case sheet the OA should find out whether the necessary tests are conducted and, if not, send the patients for the tests and record the results in the case sheet*
2. *Consider the patient's willingness as well as the health status of the patient. If the patient is a cardiac patient, they should not be advised for day care*
3. *Day care instructions should be given clearly*

Student exercise

Say true / false

1. *Diabetic person should come for day surgery.*
2. *Patient's allergy should be listed.*
3. *Adrenaline and phenylephrine can be used with cardiac patient.*
4. *Both eyes refraction need not be done.*
5. *High IOP is contraindication for surgery.*

Answer the following

1. *Why preoperative instructions are important for the patient?*
2. *Describe how day care patients are selected*
3. *Draw the flow chart for day care procedure*
4. *List the preoperative tests to be completed*
5. *List the ocular tests to be conducted before cataract surgery*

CHAPTER 10 POSTOPERATIVE OPHTHALMIC NURSING CARE

CONTENTS

Preparation of dressing
Assisting doctors in ward rounds
Identification and management of postoperative complications
Night duty of OA

GOALS

To enhance the ophthalmic assistants understanding of the purpose and preparation and follow the best practices in the preparation of dressing materials.
The OA will understand night duty and, its importance and be able to do it properly.

OBJECTIVES

The OA will be able to

- Describe the purpose and adopt the correct method of preparing dressing materials
- Understand the disadvantages of imperfect swabs and pads
- Prepare the necessary materials for dressing the eye
- Develop a wide range of basic knowledge of immediate post surgical complications
- Identify early the post operative complications
- Help doctors in prompt remedial measures
- Explain and reassure patients in a proper way about their complications
- Explain / Handle the management of emergencies, which arise at night (general and ocular)

CHAPTER 10

Postoperative Ophthalmic Nursing Care

Preparation of dressing

Required materials

- A basin containing sterile water
- Clean cotton

Step by step procedure in preparing wiper

- Wash and dry the hands thoroughly
- Fill half the basin with sterile water
- Immerse the cotton pieces into the water
- Take a pinch of cotton from the water and roll it into a round ball (round wipers- to wipe the eye of the patient after any procedure).
- Take a pinch of cotton from the water and roll it into a small strip with the ends tapering a little (This method is for strip wipers- used to remove dust / foreign body).

Points to remember

The left over cotton must be used in preparing wiper balls and wiper strips. This will reduce the wastage of cotton.

Eye pad preparation

Required Materials

1. A neat Mat
2. Scissors
3. A clean cotton roll
4. Gauze piece

Step by step procedures in preparing eye pads

1. Wash and dry the hands thoroughly
2. Spread the mat in a clean dry area
3. Spread the gauze piece and cut it into 9 square pieces
4. Unroll the cotton
5. Keep the left thumb on the front end of the cotton roll (the measurement must be 6 inches) and cut the cotton in a rectangular shape
6. When one piece is finished, keep the rectangular shape cotton on the next part of the roll and cut the next piece
7. Take one piece of the rectangular shape cotton and one strip of gauze piece
8. Keep the cotton on the middle of the gauze strip and start rolling the gauze from bottom to top of the cotton piece. The rolling should be tight
9. Cut the strip wrapped cotton in to square pieces. Each piece should measure 6 inches square. Use the thumb measurement for cutting the pieces

Points to remember

When you start cutting one roll of cotton complete the role and then start with the pad preparation.

Bandage preparation

Required materials

1. A neat mat
2. Scissors
3. A clean gauze bundle

Step by step procedure

1. Wash and dry the hands thoroughly
2. Spread the mat in a clean dry area
3. Take a roll of cotton from the bundle and fold it into 2 cubit measurement (cubit-length of the arm)
4. Cut the extra side pieces

5. Leave one lengthy end and one short end. Fold the strip and cut to the level of the ear.
6. Eight pieces of bandage could be prepared from one roll of gauze.

Points to remember

Right place, right measurement, right method must be followed while preparing the bandage, pad and wiper.

Assisting doctors in ward rounds

a. Preparations

- Ward should be clean and tidy.
- Only one attendant per patient should be allowed.
- Avoid children in the ward.
- Patient case sheets should be complete with all relevant information regarding the patient.
- Diagnostic tray should be ready for use (Local anaesthesia drops, antibiotic drops and ointment, steroid drops, sterilized cotton balls, fluorescien strips etc.)
- Do not conduct ward rounds during lunch time/ visiting hours.

b. Conducting ward rounds

- The ward OA is to stay on the patient's left side to help in the examination
- Carefully and gently remove the eye dressing , instil antibiotic drops and wipe around the eye with wiper
- Help the patient to sit before the slit lamp, request the patient to keep their chin on the chin rest and forehead against the forehead bar
- After the doctor has completed the examination, escort the patient to a nearby chair
- As per the doctor's instruction apply the drops or ointment and tie a new bandage
- Record orders/get them signed by doctors

Identification and management of postoperative complications

Cataract surgeries demand an excellent visual outcome. The technology is far improved which has to a certain extent minimized the grave complications. Early detection and treatment of postoperative complications give good visual prognosis. Proper preoperative evaluation with a good postoperative care prevents a patient from going into catastrophic vision threatening complications.

Types of surgery

1. ECCE-Extra Capsular Cataract Extraction
2. SISCS-Small Incision Suture less Cataract Surgery
3. Phacoemulsification- machine assisted

Lid edema

Swelling of the lid is due to injury with instruments, iritis, or allergy. It is treated with anti-inflammatory drugs, steroids. If allergy is the reason anti-histamine drugs are given (Fig. 10.1).

Fig. 10.1 - Lid edema

Chemosis

Chemosis is congestion and collection of fluid in the conjunctiva (Fig. 10.2).

Causes

a) Injury to the conjunctiva with instruments during surgery
b) Prolonged massage in block room

Postoperative complications

Types of Surgeries	Mild	Moderate	Severe
ECCE	Lid edema, Sub Conjunctival Haemorrahge, Chemosis, Straite Keratopathy, epithelial and endothelial damage	Corneal edema, Fibrin Membrane, iritis, Hypheama, Pupillary capture, Cystoid macular edema	Hypopyon, endophthalmitis, Decemet's membrane stripping, iris prolapse, papillary block, Secondary glaucoma, shallow Anterior Chamber, broken sutures, Suture infiltration
SISCS	Lid edema, Sub Conjunctival Haemorrahge, Straite Keratopathy, Chemosis, epithelial defect	Corneal edema, Iritis, Fibrin Membrane, hyphaema, pupillary capture, Decentered IOL, Cystoicl macular edema	Endophthalmitis, Decemet's membrane stripping, iris prolapse, papillary block, secondary glaucoma
PHACO	Lid edema, Chemosis, Sub Conjunctival Haemorrahge, Straite Keratopathy, epithelial and endothelial damage	Corneal edema, Iritis, Fibrin Membrane, pupillary capture, Cystoid macular edema	Endophthalmitis, iris prolapse, papillary through the section, pupillary block

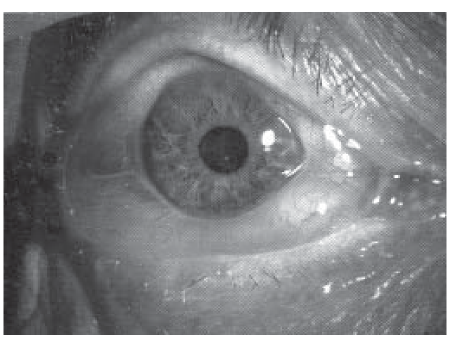


Fig. 10.2 - Chemosis

c) Intraoperative sub conjunctival injection
d) Allergic to eye drops such as tropicamide, Lidocaine
e) Post operative Iritis and endophthalmitis.

Treatment

Chemosis absorbs spontaneously and some patients need anti-inflammatory drugs/analgesics incase of pain.

Sub conjunctival haemorrhage (SCH)

It is a collection of blood beneath the conjunctiva. Injury, Retrobulbar haemorrhage, Bleeding disorders, Hypertensive, Uncontrolled cough are the causes for SCH. This is also absorbed spontaneously within 2-3 weeks.

Corneal abnormalities

Corneal transparency is one of the major factor for a good vision. After cataract surgery, cornea can lose it's transparency for many reason. They are:

a. Epithelial defect

Rupture of epithelium by instruments, swabs and pad lead to epithelial defect. After retro bulbar injection eye is opened for long time which may lead to epithelial defect. Patient has the symptoms like pain, blurring vision and irritation. Discontinuation of epithelium is seen through slit lamp. Sometimes fluorescein staining is needed.

Treatment

Antibiotic ointment with pad and bandage.

b. Corneal edema

Prolonged irrigation and aspiration, trauma to endothelium, pre excisting corneal problem are causes.

Signs

1. Increased IOP>30 mm/hg
2. Iritis
3. Descemets membrane stripping
4. Endothelial damage

Treatment

1. Timolol eye drops and Tab. Diamox are given to reduce the Intraocular pressure (IOP)
2. Oral glycerol / IV mannitol given for uncontrolled increase in Intraocular pressure
3. Frequent use of steroids speed up recovery
4. Hypertonic saline drops
5. Cycloplegic eye drops twice per day and steroids 2 hourly may reduce the iritis

c. Striate keratopathy

It may occur on the immediate post operative day and incidence is higher if the pre-existing corneal dysfunction present. It is present as a localised stromal and epithelial edema especially seen in superior half of the cornea which indicates intraoperative trauma.

Causes

Operating trauma - trauma to endothelium by instruments, IOL, Swabs, excessive irrigation of balanced salt solution. This can be prevented by maintaining a deep Anterior chamber by using the Air bubble or visco elastic material. Tight suture is another reason for striate keratitis.

Management

In general it resolves 4 to 6 weeks after cataract surgery. As a rule if corneal periphery is clear it resolved with time. In most of the cases 0.1 % of dexametyhasone sodium resolves it. Corneal edema in periphery for over 3 months does not clear. Such patients require Penetrating Keratoplasty.

d. Detachment of descemet's membrane

Descemet's membrane is an elastic membrane and it's loosely bound with the stroma and thus allowing easy separation from stroma.

Causes

1. Entry into the globe with inadequate sized incision
2. Faulty instrumentation
3. Fluid is injected between the decemet's membrane and Stroma

Management

1. Small DM detachment is common and doesn't require active treatment.
2. Wider detachment needs to be treated early. If it's diagnosed intra-operatively Air bubble should be left in the AC. This will help to holding the decemet's membrane and stroma together.
3. If it is extensive then full thickness corneal suture is needed until the healing occurs.
4. It can be prevented by using proper instrument and putting adequate sized incision.

e. Endothelial damage

The corneas can decompensate if large amount of endothelial cells are damaged. In endothelial damage visual prognosis is low because endothelium cannot regrow.

Causes

1. Trauma with surgical instruments intra-operatively
2. Constant touch by vitreous or IOL post operatively
3. Pre operative inflammatory condition.

Management

1. It can be prevented by maintaining deep anterior chamber as far as possible.
2. Endothelial cell count should be documented for pre existing corneal problem.
3. Penetrating keratoplasty may be helpful in severe cases.

Depth abnormalities

The AC may become shallow or flat in any kind of IOL surgery for many reasons. It is an absolute emergency in which treatment should be considered immediately without delay. It produces permanent damage like IOL touching the cornea and secondary glaucoma. Following conditions are the reason for the flat AC.

a. Wound leak

The main reason for the wound leak are:

a) Size of the section is larger than the normal
b) Loose suture or wound gap
c) Inadequate and improper suturing of the wound
d) External trauma after surgery even during suture removal

Management

1. If wound is too large, proper resuturing and AC reformation to be done. Wound leak can be diagnosed by sidels test. Apply 2 drops of 2% fluorescein solution over the section. If wound leak is present fluorescent solution gets diluted at the site of leak. Often gentle pressure over the globe is needed to confirm the site of leak
2. Cyclopent eye drop is applied with pad and bandage
3. Carbonic anhydrase inhibitor and beta-blockers may decrease the aqueous out flow
4. Avoiding the use of steroids enhance the spontaneous closure of wound

b. Pupillary Block

It is an emergency condition. Pupil may be blocked with many materials such as IOL, Vitreous, cortex. Pupillary block leads to rise in IOP and produces secondary glaucoma.

Causes

1. Anterior chamber intraocular lens without peripheral Iridectomy
2. Vitreous touching the pupil
3. Intraocular lens capture

Treatment

1. Inj. Mannitol 20% and Tab. Diamox are given to reduce IOP
2. YAG PI is done for ACIOL
3. IOL repositioning done for IOL capture

c. Residual cortex

This is due to improper aspiration of cortex material, PXF, small pupil, pc rent where the cortex could not be removed completely. Small residual cortex usually doesn't cause problem unless they are touching the endothelium or obstructing the AC angle. Small piece of cortex will get absorbed by using steroids. Lot of cortex or cortex not getting absorbed need AC wash.

d. Hyphema

Hyphema is blood in the AC. Main source for hyphema is intraoperative injury to Iris. Other reason for hyphema are iridodialysis bleeding disorders.

Treatment

1. Usually it resolves spontaneously
2. Severe cases patient should be monitored carefully and given complete rest

3. Apply double pad and bandage
4. Recurrent bleeding with increased IOP needs hyperosmatic therapy and rarely anterior champer wash

e. Hypopyon

Pus in the AC is called hypopyon. This can be sterile or infectious (Fig. 10.3).

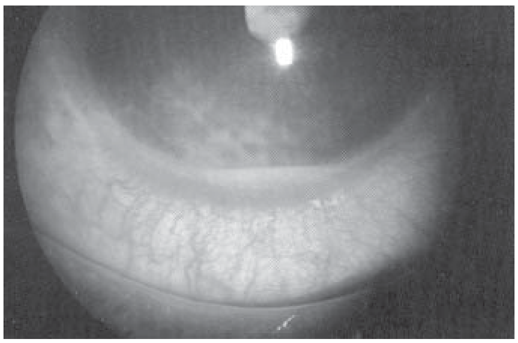


Fig. 10.3 - Hypopyon

Causes

1. Infection-It may be pre operative or post operative
2. The incidence of hypopyon is high in complicated cataract, phacolytic or phacomorphic glaucoma.

Treatment

Color of the hypopyon is noted. If it is yellow if indicates an infectious stage. First AC tap should be taken to find out the organism which caused hypopyon. Cycloplegics and Antibiotics are used according to the severity.

Iritis

Inflammation of the iris is called iritis. Due to surgical trauma or using of toxic material may lead to fibrin formation. In such cases are intensively steroids and antibiotics used. Dilation helps to break the fibrin membrane (Fig. 10.4).

1. AC cells and flare

It can be recognized by slit Lamp. Cells and flare are graded Presence of cells and flare is the sign of intraocular inflammation. Steroid eye drops is used frequently depending on the severity.

Iris prolapse

After cataract surgery iris may prolapse out from the wound. Incidence of iris prolapse is more in ECCE than phaco.

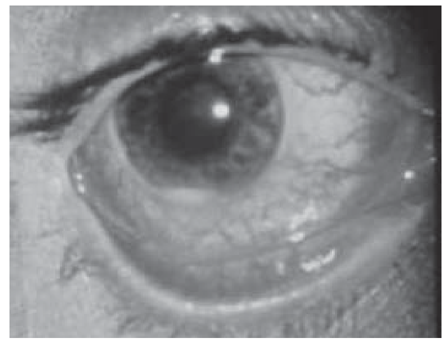


Fig. 10.4 - Iritis

Causes

1. Inadequate or irregular suture.
2. Size of the section is more than normal.
3. Injury to the eye
4. Positive pressure

Treatment

1. Hourly antibiotic drops
2. Repositioning and resuturing done in a less than a day did proplapse
3. Excision done prolapse more than 1 day

Fibrin membrane

It appear as a dense fibrin net in the pipillary area. Prolonged irrigation with balance - salt solution and unsterile IOL are the causes for fibrin membrane formation. It gets absorbed by using antibiotic and steroids hourly. If needed oral steroids to be given.

Bullous keratopathy

This usually comes in late postoperative period. The causes are pre existing endothelial pathology, significant intraoperative endothelial damage, and chronic uveitis and in appropriate IOL design. Clinically it is present as stromal and epithelial edema. Patient may manifest blurred vision early in the morning which improves later in the day. Chronic edema causes scarring. It can be managed by drops and ointment. In some cases bandage contact lens may be fitted. PKP is done for the cases, which are not responding to other treatment.

3. Secondary glaucoma

a. Closed angle glaucoma

Causes

1. Severe iritis
2. Pupillary block
3. Iris bombe and periphereal anterior synechiae

Treatment

1. Treat the causes as for iritis
2. Anti-glaucomatous drug
3. Sometimes trabeculectomy may be required

Endophthalmitis

This is a vision threatening condition; delayed treatment would cause severe visual loss. Endophthalmitis can present as an acute form or chronic form. Patient has the symptoms of mild to severe pain, redness, loss of vision, floaters, photophobia. The hallmark of endophthalmitis is vitreous inflammation. Other findings are eyelid and periorbital edema, chemosis, corneal edema, AC reaction, hypopyon.

Investigations

1. Vitreous culture is taken in a sterile conditon. This is to identify the type of organism which cause endophthalmitis and also we can differentiate the sterile endophthalmitis from infectious endophthalmitis.
2. Ultrasound to confirm the diagnosis. It has the characteristic like RCS (Retina, choroids and sclera) Complex thickening and vitreous exudation.

Treatment

Immediate diagnosis and treatment may give better visual prognosis. Antibiotic can be given intravitreally. Intense therapy of antibiotics and steroids will help to reduce the reaction of endophthalmitis. Once the diagnosis is made, refer the patient to retina specialist without delay. Many cases require core vitrectomy.

Posterior capsular opacification (PCO)

This is a late postoperative complication in which a white membrane is formed behind the IOL. This can be managed by YAG capsulotomy.

Cystoid macular edema (CME)

This is one of the vision threatening complication, it may occur early in the late post op periods. Reason for CME after cataract surgery is still unknown. But it is believed to occur due to the increased perifovealor capillary abnormality. Intra vitreal steroids are given in the recent days. It can be diagnosed by Fundus fluorescein angiography and optical coherence tomography. The later one is preferable as it is a non-invasive procedure.

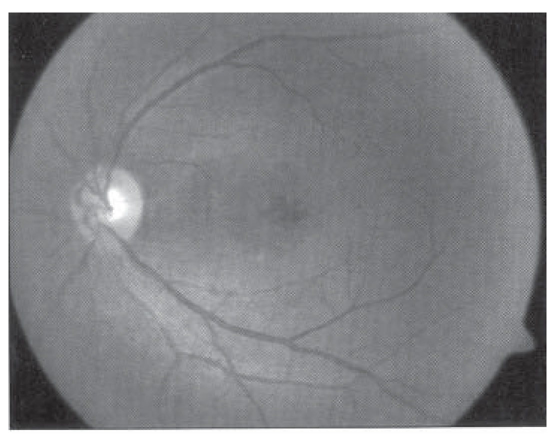


Fig. 10.5 - Cystoid macular edema

Night duty of OA

Rules and responsibilities of night duty OA

Arrival: Night duty OA arrives at 6.00 PM or according to the hospital schedule. On entering the ward she must know the name of the Doctor posted for night duty.

Charge take over: Night duty OA has to take over the preoperative case sheets from day duty OA and collect information about complicated cases and other details.

Work description

Monitoring

Checking the preoperative case sheets regarding completion of details in the case sheet. If any investigation is not completed, it must be completed immediately.

Execution

- Self introduction to the patient
- Application of eye drops for preoperative and postoperative patients (Steroids & antibiotics accordingly)
- If any ocular or systemic complications are seen, they have to be told to the night duty doctor immediately and necessary steps taken
- In the morning of the surgery apply dilating drops to preoperative cases, and send the cases to operation theatre in batches after confirming the timing with the theatre staff
- If any patient need to be discharged, complete the discharge rounds

Charge hand over

- While handing over to day duty OA in the morning. All the necessary details about ward cases should be conveyed.
- Post operative complications, though rare, are extremely important to recognise. The OA must notify the doctor immediately.
- Some complications require no treatment, and will not affect the outcome. However, the OA must never make any assumptions about the seriousness of the complication and must always report to the doctor.

Summary

In this unit we have covered preparation of dressings, assisting the doctors in the post operative examination, identification and management of complications and the responsibilities of night duty OA. Postoperative results are highly dependent on the accuracy and attentiveness of the OA. The OA must always have concern for the patient's doubts, fears or confusions.

Key points to remember

- *Cleanliness is most important in preparing dressings and bandages*
- *The OA should not waste the materials*
- *Always be attentive to the patient's needs and concerns*
- *The OA is responsible for the smooth running of the postoperative check up by doctor*
- *The OA is to be alert to notice the potential complications in the eye of the patients and inform the doctor*
- *Reassure the patient that everything will be taken care of*
- *The night duty OA should communicate to the day duty OA, information about those who might need more observation and assessment*

Student Exercise

I. Fill in the blanks

1. *The first step in preparing any dressings is -------------------------------.*
2. *Two essential figures in the ward round are--------------and-----------------.*

3. *Three causes of severe pain after cataract surgery are---------,-----------and--------.*
4. *If the lids do not open because of severe inflammation --------------------- drug will be prescribed by the doctor*
5. *Treatment of sub conjunctival haemorrhage is ----------------------*

Answer the questions

1. *What is lid edema?*
2. *List three causes of conjunctiva chemosis*
3. *What are the steps to be taken for wound leak?*
4. *Describe the steps necessary in preparing eye pads.*
5. *What are the materials needed for bandage preparation?*

CHAPTER 11 MANAGING EMERGENCY CONDITIONS (SYSTEMIC)

CONTENTS

Asthma
Diabetes mellitus
Hypertension
Cardiac arrest
Shock

GOALS

To enhance the knowledge of the ophthalmic assistant about the systemic diseases

OBJECTIVES

The OA will be able to

- To identify systemic diseases of patients
- To record about the disease
- To inform the physician about the condition of the patient
- To give the appropriate medicine to the patient

CHAPTER 11

Managing Emergency Conditions (Systemic)

Asthma

Asthma is a respiratory illness characterised by difficulty in breathing, wheezing and constriction in the chest. In response to a trigger, the air tubes of the lungs become narrower or completely blocked due to inflammation, thus restricting normal breathing. The condition affects the bronchi or bronchioles (airways); it does not affect the lungs' air sacs. Narrowing results, when the lining of the airways becomes inflamed and the muscles surrounding the airways contract. Asthma is one disease, but it has two main underlying components that happen deep within the airways of your lungs.

A.Inflammation. The airways of the lungs are often swollen and irritated and become more swollen and irritated when an attack begins. This swelling and irritation is known as "inflammation." Inflammation can reduce the amount of air taken in or breathed out of the lungs. In some people with asthma, the mucus glands in the airways produce excessive, thick mucus, further obstructing the airways.

B.Constriction. The muscles around the airways in the lungs squeeze together or tighten. This tightening is called bronchoconstriction. It can make it hard for breathing the air in or out of your lungs.

Inflammation and constriction together cause narrowing of the airways, which can result in wheezing, chest tightness, or shortness of breath.

The most common symptoms of asthma are

- Shortness of breath
- Wheezing
- Constriction of the chest muscles
- Coughing
- Sputum production
- Excess rapid breathing / gasping
- Rapid heart rate
- Exhaustion.

Symptoms

"Warning signs" symptoms

The appearance of asthma symptoms or their increased frequency can be early warning signs of an impending asthma attack. Some people experience a change in symptoms days in advance while others only have a few minutes notice. The most common warning symptoms are:

- An increase in wheezing or shortness of breath
- Shortness of breath or coughing after exertion or exposure to cold air
- Disturbed sleep because of coughing, wheezing, or shortness of breath
- Chest tightness or pain
- Poor response to asthma medications
- A fall in peak flow meter reading (usually the earliest warning sign)

The severity of attack symptoms can escalate rapidly. It is critical that treatment begins immediately to avoid life-threatening complications. Without prompt attention breathing can become even more labored and lead to decreasing amounts of oxygen in the blood. Blue lips or fingernails can be the first symptoms of this serious development.

Basics: types of asthma

Asthma is often put into categories or groups based on the "triggers" that cause the asthma symptoms or attacks. These categories or types of asthma are:

Allergic asthma

Allergic asthma is triggered by an allergic reaction to allergens such as pollen or pet dander. People with this type of asthma typically have a personal and/or family history of allergies (such as hay fever) and/or eczema (skin problem resulting in itching, a red rash, and sometimes small blisters).

Seasonal asthma

Trees, grass or flowers releasing pollen into the air can trigger seasonal asthma, a form of allergic asthma. For example, some people find that their asthma is worse in the spring when there is an increase in flowering plants. Others find their asthma is worse in the late summer or early fall when ragweed and mold from leaves on trees are more likely to cause problems.

Non allergic asthma

Asthma can occur in the absence of allergies also. Asthma attacks may be triggered or made worse by one or more non allergic asthma triggers including materials (irritants) in the air , such as tobacco smoke, wood smoke, room deodorizers, pine odors, fresh paint, household cleaning products, cooking odors, workplace chemicals, perfumes, and outdoor air pollution. Respiratory infections, such as the common cold, the flu, or a sinus infection may also give you symptoms. Finally, exercise, cold air, sudden changes in air temperature and even gastroesophageal reflux (heartburn) may be triggers for people with non-allergic asthma.

Exercise - induced asthma

Exercise-induced asthma (EIA) refers to asthma symptoms that are triggered only by exercise or physical activity. These symptoms are usually noticed during or shortly after exercise. Exercising outdoors in the winter seems to be particularly bad for patients with this type of asthma. Exercise can also trigger symptoms in people with other types of asthma.

Nocturnal Asthma can occur in a patient with any type of asthma. It refers to asthma symptoms that seem worse in the middle of the night.

Things that can cause asthma symptoms to get worse at night may include sinus infections or postnasal drip caused by allergens like dust mites or pet dander. The body clock may also play some role: levels of substances the body makes like adrenaline and steroids, both of which protect against asthma, are lowest between midnight and 4 AM, making it easier for people with asthma to get symptoms during these times.

Diagnosis

A device called a peak flow meter is used to diagnose asthma, and to monitor the progress of treatment. A peak flow meter measures how much, and how fast, air can be expelled from the lungs. This type of test of lung function is known as spirometry. Spirometry gives a measure of how severely breathing is affected. If measured regularly, over time, these readings can also help reveal how well or badly the asthma is being controlled

Treatment

Inhalers: The most common way of taking treatment is with an inhaler – or "puffer" that delivers a precisely measured dose of a medicine in aerosol or fine powder form. The two main types of medicines used in inhalers are relievers and preventers.

- A reliever medicine helps to open up the airways and works rapidly. It is used at the beginning of an asthma attack. Common reliever medicines include salbutamol (Ventolin), terbutaline and ipratropium. Inhalers containing these medicines are coloured blue.
- Preventer drugs, which can be used together with relievers, are for preventing the symptoms. Most preventers are inhaled corticosteroids, usually referred to simply as steroids. They act to reduce the inflammation in the airways.

Tablets

If asthma is quite severe or unpredictable, it may be necessary to take a course of steroids in tablet form. These work in the same way as inhaled preventers, by reducing inflammation.

Nebulisers

Nebulisers make a mist of water and asthma medicine that is breathed in. They can deliver more of the drug to exactly where it's needed than conventional inhalers can. This is particularly critical in the event of a serious asthma attack.

Diabetes mellitus

The pancreas is a yellowish gray gland situated behind the stomach. It is 18cm long and weighs 60 grams. There are cells called Islets of Langerhans in the pancreas which produce endocrine secretions.

Langerhans Islets

Langerhan Islets contains three types of cells

1. Alpha cell
2. Beta cell
3. Delta cell

Alpha cells and Beta cells produce hormones which help to maintain blood glucose levels.

Alpha cell

Glucagon is the hormone secreted by alpha cells. This promotes glycogen breakdown, thereby raising blood glucose levels.

Beta cell

These cells produce a hormone called insulin which lowers blood glucose by converting glucose to glycogen inside muscle cells. Insulin is produced when blood glucose levels are rising and glucagon when glucose levels fall in blood.

Diabetes mellitus

Diabetes mellitus is failure of the pancreas to secrete sufficient insulin to meet the body's requirements, or defective insulin action.

Two main groups of diabetes are

Type I diabetes

Type 1 diabetes involves deficiency of insulin occurring in the younger age group less than 30 years. It is due to hereditary factors or recent viral infection affecting the pancreas. These patients are thin and need life long insulin treatment, as there is no insulin secretion in their body.

Type II diabetes

This type develops in the older age group more than 40 years of age. It involves resistance to insulin action. These patients are usually overweight. They have reduced production of insulin, so treatment can be diet control, oral anti diabetic drugs and insulin only if necessary.

Symptoms of diabetes

Insulin is required for glucose to enter cells where it is utilised. When insulin is absent or defective glucose cannot enter cells it remains in the blood in high amounts. Symptoms of diabetes occur because body tissues are not able to utilise glucose.This condition is called diabetes or hyperglycemia.

1. Polyphagia

These patients have increased appetite, and eat more than usual. This is because cells are starved of glucose since glucose is not able to enter cells because of the cells' resistance to insulin. Although a diabetic person eats more, the cells do not get enough glucose.

2. Polyuria

Patient passes large volumes of urine. Normal urine does not contain glucose. In diabetics, kidneys are unable to reabsorb the excess glucose, so it appears in the urine. When glucose appears in urine, it drains a lot of water with it causing excessive urination.

3. Polydipsia

It is excessive thirst due to loss of water from the body.

4. Fatigue and weight loss

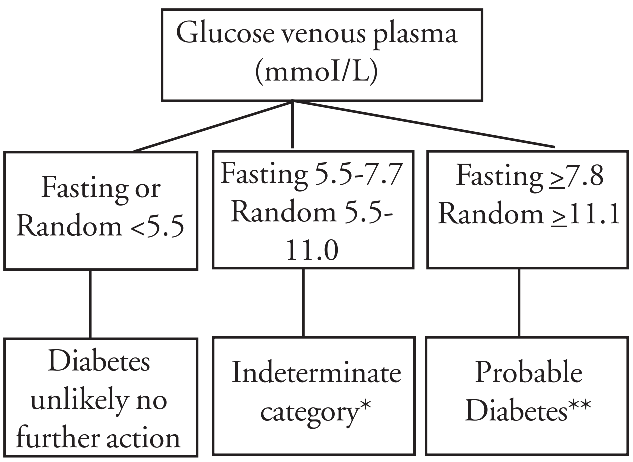
In order to obtain energy, cells start using body fat and protein for energy instead of glucose. This leads to weight loss and tiredness.

Some people may not have any symptoms. They are discovered on routine urine and blood examination.

Diagnosis of type 2 (NIDDM) diabetes

- The diagnosis of diabetes is made in one of the following ways
- With classical symptoms and an unequivocally raised fasting (>= 7.8 mmol/L) or random plasma glucose level (>= 11.1 mmol/L)
- Without symptoms and 2 unequivocally raised fasting (>= 7.8 mmol/L) or random plasma glucose (>= 11.1 mmol/L) levels or
- With an oral glucose tolerance test (OGTT)

Diabetic diagnosis chart



**** Indeterminate category**

- Assess presenting symptoms and/or signs
- Assess risk factors if considered at high risk of Type 2 diabetes or impaired glucose tolerance, proceed to oral glucose tolerance test ± periodic surveillance.

**** Probable diabetes**

- With suggestive symptoms, a single plasma glucose will suffice for diagnosis
- Without symptoms, 2 unequivocally raised plasma glucose values or an oral glucose tolerance test are required to establish diagnosis.

Oral glucose tolerance test (OGTT)

Indication

- If the fasting or random plasma glucose level is equivocal
- In the presence of two or more risk factors for Type 2 diabetes or impaired glucose toleranace (age -40, positive family history, overweight, hypertension, hyperlipidemia)
- In pregnant women

Procedure

- The patient should not restrict their food intake during the 3 days preceding the test.
- The patient should fast for 10-16 hours immediately before testing.
- The test should be scheduled in the morning.
- A fasting blood sample is taken, and the plasma glucose level is determined (if >= 7.8 mmol/L no need for further test).
- 75g of glucose, diluted in 250 mL of water, is given by mouth, within 5 minutes.
- After 2 hours, a second blood sample is taken, and the plasma glucose level is determined.

The Result of the oral glucose tolerance test can be evaluated as follows (Using plasma venous sample)

	Normal	Impaired glucose tolerance	Diabetes
Fasting value	< 5.5 mmol/L	5.5 - 7.7 mmol/L	>= 7.8 mmol/L
2-hour Value	< 7.8 mmol/L	7.8 - 11.0 mmol/L	>= 11.1 mmol/L

Investigations

1. Urine test

Presence of glucose in urine is known as glycosuria. This can be detected by Benedict's test or strip method.

Benedict's test – method

Patient is informed that their urine specimen is required for testing urine sugar. Urine is collected in a clean bottle.

- 5ml of Benedict's solution is added to clean test tube and boiled
- 8drops of urine is added to the above solution using a dropper. This is boiled again for two minutes. If there is a colour change it indicates that sugar is present in the urine.

Green = +

Yellow = ++

Orange = +++

Brick red = ++++

2. Blood sugar

Normal blood sugar is 70-100 milligrams in fasting state and 110-140 milligrams post prandial. Fasting blood sugar of > 126mg (70m mmol/l) and post prandial (2hour) blood sugar of greater than 200mg (11.0 mmol/l) is suggestive of diabetes.

Treatment of diabetes consists of three main components

a. Diet and exercise
b. Oral hypoglycemic agents
c. Insulin

a. Diet and exercise: It is the corner stone of diabetic management.

Sugar containing items are to be avoided. Balanced food within permitted calorie limits as prescribed by the doctor is taken.

Exercise helps in glucose utilisation and maintaining ideal weight.

b. Oral hypoglycemic drugs

They are categorized into the following groups:

1. Sulphonyl urea – consist of drugs like Glibenclamide (Dasmil)
2. Biguanides – Met formin
3. 2 Glucoxidase inhibitors
4. Glietezones

Drugs are started according to advice of family physician mainly use in Type II diabetes.

c. Insulin

Insulin is used in type I diabetes life long and in type II diabetics when blood sugar is not well controlled. Insulin has to be given only by injection continuously.

Types of insulin

1. Short acting
2. Intermediate acting
3. Long acting

1. Short acting insulin (Plain insulin)

Duration of action is from 2 hours to 8 hours usually given 2-3 times per day.

2. Intermediate acting (NPH)

In this type of insulin action starts after 4 hours, effective for 24 hours.

3. Long acting (PZI)

Effective for 24-36 hours. Once daily dose is enough.

Complications of diabetes

1. Acute complications
2. Chronic complications

Acute complications

1. Diabetic ketoacidosis

It is a medical emergency which occurs in

a. Infection or stress which increases insulin requirements.
b. Patients not on treatment
c. First time diabetic, previously undiagnosed.

Here blood sugar levels are very high (200-600mgms) due to lack of insulin. Glucose is not available for metabolic energy; instead fats are used by the body for energy. During fat metabolism, toxic products called ketones are formed, which gives rise to ketoacidosis.

Signs and symptoms

- Gradual onset
- Patient may be febrile
- Vomiting, abdominal pain
- Dry inelastic skin
- Low blood pressure and rapid pulse
- Deep sighing respiration
- Breath smells of acetone (sweat, sickly smell)
- Loss of consciousness
- Diagnosis is made by blood sugar estimation and presence of ketones in urine.

Treatment

I.V fluids are immediately started since patient is dehydrated. A large volume of about 6 litres is given rapidly. Normal saline or Ringer Lactate is given.

Short acting plain insulin is given hourly according to blood sugar level. Insulin is given intravenously in this condition. Insulin is given hourly until the smell of acetone is absent and blood sugar is less than 200 mg.

Serum electrolytes are estimated and potassium chloride and sodium bicarbonate given accordingly.

Antibiotics are started if signs of infection are present

Patient may be catheterised to check hourly urine sugar and acetone. Fluid balance chart – Intake and output of fluid should be accurately recorded. When the patient is conscious, oral fluids are allowed.

Hypoglycemia

Occurs when blood sugar is low, less than 60 mg. Occurs in the following situations.

- Too much insulin
- When food is missed
- Increase in exercise

Signs and symptoms

a. Sweating – skin is warm and moist
b. Pallor
c. Weakness / dizziness
d. Palpitation
e. Loss of consciousness

Diagnosis is made by low blood sugar level

Treatment has to be immediate since brain cells can have irreversible death if glucose level is not immediately corrected.

1. When patient is conscious fluids with sugar or glucose can be given
   - Intravenous glucose – 25% dextrose 50ml is given in severe cases. This is followed by 5% dextrose fluid for few hours.
   - Glucagon injection 1ml is given if patient is unconscious

Points to differentiate between hypoglycemia and hyperglycemia

Clinical features	Hyperglycemia	Hypoglycemia
Onset	Gradual	Sudden
Skin	Dry and cold	Warm & moist
Pulse	Faint and fast	Normal
Blood pressure	Low	Normal
Breathing pattern	Deep and sighing	Normal
Breath smell	Acetone odour	Normal
Blood sugar	High	Low
Treatment	I.V. fluids, insulin	I.V. glucose

Long term complications

Occur when diabetes is poorly controlled

1. Ocular

Diabetes affects the eyes causing cataract, diabetic retinopathy, retinal detachment and glaucoma. Permanent visual loss can occur due to above complications.

A Diabetic is prone to get any kind of infection more easily than a normal person. Also the infection takes longer to clear up. Diabetes affects the eye in many ways. In the eye, as well as the rest of the body, diabetes reduces the healing capabilities. Corneal abrasions take much longer than normal to heal. When blood sugar rises dramatically, the lenses within the eyes begin to swell.

This will cause a change in the eyeglass prescription. When the blood sugar returns to normal levels, the lenses return to their normal shape. With progression of diabetes, there is a decrease in oxygen supplied to various tissues in the body. Those tissues that metabolise, or reproduce faster than others require more oxygen and therefore will be more susceptible to diabetes. These tissues associated with progressive diabetic changes are referred to as the three "opathies". These are neuropathy (damage to nerves), nephropathy (damage to the kidneys), and retinopathy (damage to the retina).

Since the cells of the retina are constantly utilised by light, they are constantly metabolising waste products that need to be removed. This requires plenty of oxygen. If there isn't enough oxygen, these tissues become starved and emit a "vasoproliferative substance". This substance acts like a signal to the body that there is an area that requires more oxygen. The body reacts by growing new, abnormal vessels into the area, a process referred to as neovascularization. These blood vessels can be very damaging to the vision.

To stop these vessels from proliferating, doctors must stop the release of the vasoproliferative substance. This is acheived by lasering the retina that is producing it. Unfortunately, the damaged retina is no longer functional. Even if a patient is newly diagnosed and has no symptoms of diabetes, they still require a thorough baseline exam to which future exam results can be compared.

2. Renal

Long duration of poorly controlled diabetes leads to proteniuria and renal failure.

3. Heart

Increase in incidence of heart attacks occurs. These people can have “silent heart attack” without any pain since nerves become insensitive to pain.

4. Brain

Stroke occurs more frequently in diabetics.

5. Nerves

Commonly affects peripheral nerves. Tringling occurs in fingers and toes, reflexes may disappear. Painless ulcers can occur in skin.

6. Feet

Poor circulation and peripheral neuropathy causes infection or injury to feet, leading to gangrene and loss of foot. Diabetics need to take special care of their feet.

Complications associated with type 2 diabetes

- Ischaemic heart disease
- Peripheral vascular disease
- Hypertension
- Hyperlipidaemia
- Chronic foot ulcers which needs amputation
- Polyneuropathy
- Autonomic neuropathy
- Reduced visual acuity
- Clinical nephropathy
- Urinary tract infections

Evidence is mounting that if Type 2 diabetes is recognised earlier and treated more effectively, the progression of complications can be slowed and the morbidity and mortality associated with this condition could be reduced.

Early and more effective treatment can be achieved through early diagnosis namely, screening by measuring blood glucose levels in patients at risk, or those presenting with symptoms associated with diabetes.

Prevalence

- It has been estimated that the overall prevalence of Type 2 diabetes in caucasian populations is approximately 2%. However, the prevalence of Type 2 diabetes increases with age:
- 4% of the population above 60 years of age
- 10% of the population above 70 years of age.

Furthermore, it has been estimated that approximately another 2% of the total population currently have undiagnosed Type 2 diabetes.

Clinical management guidelines: Blood glucose

Background: The occurrence and progression of microvascular complications can be reduced by improved blood glucose control.

Aim: To achieve blood glucose control as near to normal as possible without producing unacceptable hypoglycemia.

Procedure

Measure HbA1c

If unavailable measure fructosamine. (If unavailable measure fasting / 2 h postprandial blood glucose.)

Frequency of measurement

- Every 3-6 months for insulin-treated patients.
- Every 6-12 months for non-insulin treated patients.

Interpretation of results

Parameter	Goal	Needs Improvement
HbA1c (%)	Normal	> 2% above normal
Fructosamine (µmol/L)	Normal	> 360
FastingPlasma Glucose (mmol/L)	4.0 - 5.5	>= 7.8
2h Postprandial Plasma Glucose (mmol/L)	< 7.8	>= 11.1

What to do if blood glucose is not controlled?

- Explore reasons for unsatisfactory control.
- Review treatment.
- Consider referral to diabetes educator.
- Consider referral to dietitian.

Consider referral to Diabetologist/Diabetes Clinic. Adjust medication and consider insulin if on maximum doses of oral agents.

Clinical management guidelines: weight

Background: Weights above a Body Mass Index (BMI) of 28 for men and 27 for women is associated with excessive cardiovascular mortality. Target weights should aim to achieve a lower BMI than these levels.

Aim: To reduce weight to lower BMI below the above critical levels.

Procedure

Measure height and weight of patient at initial visit and calculate BMI (Weight(kg) / Height(m).

Refer to the Table to determine the maximum weight which will achieve the target BMI.

Weight to achieve the target Bmi

Height (cm)	Men Weight (kg)	Women Weight (kg)
150	63	61
155	67	65
160	72	70
165	76	73
170	81	78
175	86	83
180	91	88

What to do if weight is not controlled?

- Refer to dietitian or provide basic dietary advice.
- Advise about exercise program.

Clinical management guidelines: Retinopathy

- Background: Retinopathy is common and prevalence increases with increasing duration of diabetes.
- Up to 20% of people with NIDDM have retinopathy at the time of diagnosis.
- Visual impairment is rare in the early stages and should not be used as an indicator of retinopathy. Normal visual acuity does not exclude significant retinopathy.

Aim: To identify individuals who require referral to an ophthalmologist for treatment and/or further assessment.

Procedure

- Check visual acuity with Snellen chart - correct with pinhole if indicated.
- Dilate pupils.
  Examine fundi

What to do if not controlled?

- Refer to ophthalmologist:
- If visual acuity is < 6/6 in either eye at initial examination.
- If declining visual acuity at subsequent visits.
- If any retinal abnormalities detected.
- If unable to get a clear view of the retina.
- Once in 2 years.

Clinical management guidelines: diabetic nephropathy

Background

- Incipient nephropathy can be detected by urine testing for microalbumin. Microalbuminuria is a strong predictor of macrovascular disease in Type 2 diabetes and such patients require careful assessment and follow up.

Aim: To identify and treat individuals with micro albuminuria in order to reduce the number progressing to overt nephropathy.

Procedure: Test for microalbumin in urine sample, either timed collection or first morning sample.

How often: At diagnosis and then annually.

Interpretation of Result

	Albumin (μg/min)	Albumin : Creatinine Ratio
Normal	< 20	Male 0 - 2.5 Female 0 - 3.5
Microalbu -minuria	20 – 200	Male 2.6 - 30 Female 3.6 - 30
Macroalbu -minuria	> 200	> 30

What to do if micro albuminuria and hypertension are present

- Review blood pressure and treat with a pharmacological agent to control blood pressure as outlined in the guidelines on blood pressure.
- Consider referral to a physician experienced in the care of diabetic renal disease.

If microalbuminuria only is present

- Review diabetes control and improve if necessary.
- Treat with a pharmacological agent

(Recommended first line of therapy: ACE Inhibitor.

If adverse effects develop, treat with calcium channel blockers).

If macroalbuminuria is present: refer to a physician experienced in the care of diabetic renal disease.

Clinical management guidelines: lipids

Background: The occurrence of macrovascular complications is influenced by lipid abnormalities.

Aim: To normalise lipid levels.

Procedure

- Measure lipids including total cholesterol, triglycerides, HDL cholesterol. Frequency of measurement

If lipids are normal   every12 months

If lipids are abnormal   every 3-6 months

Interpretation of results

Parameter	Goal	Needs Improve ment	Action Recomm -ended
Total Chole sterol (mmol/L)	< 5.5	5.5 - 6.5	> 6.5
Trigly cerides [mmol/L]	< 2.0	2.0 - 4.0	> 4.0
HDL Chol esterol [mmol/L]	> 1.0	-	< 1.0

What to do if symptoms are not controlled?

1. Non-pharmacological interventions initially including,

- Improve blood glucose control
- Reduce saturated fat intake
- Regular moderate exercise
- Weight control if indicated
- Reduce alcohol intake if triglycerides elevated

2. Consider referral to dietitian

3. If the above interventions are unsuccessful after 6 months, consider pharmacological therapy.

Points to remember

- *People in their 50s getting recurrent stye should get their blood sugar checked for diabetes.*
- *The risk of blindness in diabetics is 25 times greater than the normal population.*
- *Frequent fluctuations in blood sugars leads to earlier development of cataract.*
- *Diabetics are more likely to develop inflammation of the eye after any surgery, esp. cataract surgery.*
- *Diabetics develop changes in the retina, called Diabetic Retinopathy (DMR).*
- *Optic Neuritis, an inflammation of the optic nerve can occur.*
- *The elderly diabetics may discover a 'crooked face' or inability to close one eye. This is due to a nerve palsy. Due to paralysis of one or more nerves, the muscles are affected, leading to disability. Consult the doctor, don't worry, most recover with time.*

Hypertension

Background

- Hypertension is a recognised risk factor for microvascular and macrovascular complications of diabetes.

Aim

- To identify individuals with elevated blood pressure and to reduce blood pressure see the below the following target levels:

1. In non-pregnant diabetic patients aged 18-40 years
   - Systolic <= 140 mmhg and diastolic <= 90 mmhg
2. In diabetic patients aged > 60 years
   - Systolic <= 160 mmhg and diastolic <= 90 mmhg

Procedure

- Measure blood pressure after a minimum of 5 minutes sitting. Record diastolic at the disappearance of sounds (phase 5).

How often:

- Every clinical visit

Interpretation of results

Category	Age (Years)	Systolic BP (mm Hg)	Diastolic BP (mm Hg)
Normal	18 - 40	<= 140	<= 90
	> 60	<= 160	<= 90
Hypertension	18 - 40	> 140	> 90
	> 60	> 160	> 90
Systolic	18 - 60	> 140	<= 90
Hypertension	> 60	> 160	<= 90

What to do if blood pressure is not controlled?

1. All patients should receive non-pharmacological interventions including
   - Weight control
   - Regular moderate exercise
   - Reduced salt consumption
   - Reduced alcohol consumption
   - Cessation of smoking
2. If pharmacological intervention is required, ACE inhibitors and calcium channel blockers are the preferred agents for treating hypertension in people with diabetes (unless contraindicated).

Cardiac arrest

I. Resuscitation

Cardiac arrest is the sudden failure of the heart to supply adequate blood circulation. It occurs in two forms - asystole, when there are no contractions of the myocardium at all and ventricular fibrillation, when the contraction of the myocardium is uncoordinated and ineffective. Effective circulation must be restored within three minutes to prevent irreversible brain damage.

The most common causes of cardiac arrest are

1. Myocardial infarction
2. Anaesthesia over dosage
3. Electrolyte imbalance
4. Drowning
5. Electrocution
6. Shock

The OA must know

1. How to diagnose cardiac arrest
2. How to summon the emergency team
3. How to initiate resuscitation effectively
4. Where to find the necessary equipment

Signs of cardiac arrest are

1. Unconscious patients without pulse, low or unrecordable blood pressure, absent respiratory movements.
2. Cyanosis
3. Cessation of heart beat
4. Dilated pupils - (not a reliable sign in ophthalmology due to use of dilating agents)

Management

Upon discovering a collapsed patient the OA must act quickly and calmly. Initially she should try to rouse the patient by shaking them carefully and calling out their name. The OA must remember that the patient who has fainted has a palpable pulse.

If the patient is unresponsive the OA should then shout for help- alert a colleague to summon medical aid and bring the resuscitation trolley/ECG machine and defibrillator. On no account OA must leave the patient to look for help. It should only take a matter of seconds for the OA to diagnose cardiac arrest. A useful aid to remember in emergency is ABC.

A – Airway

B – Breathing

C – Circulation

The OA should open the airway to see if it is clear. This is done by the combined maneuver of head tilt and chin lift. Any obvious obstruction should be removed from the mouth. To establish if the patient is breathing the OA should observe the patients chest to see if there is any movement or listen for breath sounds and feel for exhaled air on the back of her hand.

If the patient is not breathing, mouth to mouth or nose breathing should be commenced by the OA. Initially, two slow full breaths should be given, each sufficient to cause the chest to rise. The chest should be allowed to fall between inflations. When a colleague arrives with the resuscitation trolley, an oral airway should be inserted and a bag and mask (ambu bag) used to ventilate the patient. Before proceeding to this step, the OA should establish if the patient has circulation by checking the carotid pulse. The pulse should be palpated for at least five seconds to find whether the circulation has stopped.

If the pulse is absent cardiac compression should be commenced.

Before doing so, it is important to ensure that the patient is lying on their back on a firm surface. Kneeling by the side of the patient, the nurse should locate the base of the heart. The position of the hands should be two fingers breadth above this point.

The ribs are depressed forcefully and rythmically by about 3-5cm, 60-80 times per minute in an adult. The arms should be kept straight when performing cardiac massage. It is important not to compress too quickly since the ventricles will not have enough time to refill with blood. Some find it helpful to establish the rhythm by saying one-one thousand, two-one thousand, and three-one thousand. The hands must be carefully positioned and should not lose contact with the point of compression.

If too low, pressure on the xiphoid process may cause internal injury. The fingers should be raised; pressure by the fingers or the hand on the ribs may cause rib fractures.

If there are two OAs, one should carry out cardiac compression while the other delivers one breath after every fifth compression. If there is only one OA the compression to ventilation ratio is 15:2. The OA should check for the return of the pulse and breathing after one minute and thereafter every three minutes. If pulse and breathing are still absent, she should continue resuscitation until medical help arrives.

On arrival of medical help

To be of maximum help to the doctor, the OA should be familiar with the location and use of equipment and drugs on the emergency trolley. ECG electrodes will be required and applied at once to record heart rate and rhythm. The patient should be intubated immediately, ideally by an anaesthetist. If no anaesthetist is available, the attending doctor will have to intubate the patient himself and delegate a nurse to ventilate the lungs via an ambu bag connected to a continuous supply of oxygen. The doctor must set up an intravenous infusion as soon as possible in order to administer I.V. drugs.

If the patient is in ventricular fibrillation, this can be corrected by electrical fibrillation. The defibrillator machine delivers electrical shock to the heart muscle which stops the chaotic electrical activity and allows normal electrical conduction and normal heart rhythm to return. The doctor applies electrode jelly to the paddles to prevent skin burns. These are placed at the right upper chest and the left axilla so that the electric current will pass across the chest through the cardiac muscle. To avoid getting a shock, everyone must stand well clear of the bed when the defibrillator is operated. If defibrillation is unsuccessful the doctor has to give the patient I.V. adrenaline 1mg, followed by I.V. lignocaine.

If the patient is in asystole, there is no electrical activity and the ECG shows a straight line. Defibrillation will have no effect whatsoever because there is no electrical output from the heart. The doctor has to give the patient I.V. adrenaline 1mg followed by I.V. atropine 2mg.

Post resuscitation care

The patient's airway, breathing, circulation and blood pressure are assessed. The doctor should arrange for the patient to be transferred to an intensive care unit where he can be observed, monitored and treated (arterial blood gases and electrolytes should be taken by the doctor).

Notes about drugs in the emergency drug box

1. Adrenaline

This increases the heart rate and increases the force of cardiac contraction. It is supplied in 1ml ampoules of 1/10,000. Dosage is initially 1ml until an effect is obtained.

2. Isoprenaline

This primarily increases heart rate but also increases the force of cardiac contraction. It is supplied in 2ml ampoules of 50mg per ml.

3. Atropine

This increases the heart rate. It is supplied in 1ml ampoules of 600mg per ml.

4. Calcium chloride

This increases temporarily the force of cardiac contraction and will reduce the effect of dangerously high blood potassium. It is supplied in 10ml ampoules of 10% calcium chloride.

5. Lignocaine

This is local anaesthetic that acts on the heart to reduce electrical excitablility (It suppresses ectopic and the likehood of ventricular tachycardia or fibrillation) and is supplied as 10ml ampoules of 10mg per ml.

6. Aminophylline

This causes bronchodilatation and therefore relieves bronchospasm. It is supplied in 10ml ampules of 250mg/ml.

7. Hydrocortisone

This is an anti-inflammatory steroid used in anaphylactic shock. It suppresses tissue oedema and is supplied in 1ml ampules of 100mg.

8. Naloxone

This reverses the depressant and analgesic effect of opiate narcotics. Supplied in 1ml ampules of 400mg.

Very important

When you take a drug for use from the box, read the label to be sure it is the drug you have been asked for.

Shock

The supply of oxygen to the tissues is essential in the maintenance of life; this can only be ensured when the circulatory system is functioning normally. Sudden collapse of the circulation known as shock is one of the common and formidable conditions in clinical practice.

Clinical causes

1. Haemorrhage
2. Severe wounds
3. Severe burns
4. Multiple fractures
5. Pulmonary embolism
6. Myocardial infarction (heart attack)
7. Severe infection
8. Severe allergic reaction

Signs and Symptoms

Varies with type of shock

1. Apprehension, light headedness
2. Generalized itching
3. Swelling of eyelids, lip, tongue, hands, feet.

4. Skin colour pale and grey, slow capillary refill of nail beds.
5. Cool, moist skin
6. Weak, rapid pulse
7. Fast, shallow breathing
8. Low blood pressure

Types of shock

1. Hypovolemic – blood or plasma is lost from circulation to exterior of the body or into the tissues. Also may be due to dehydration.
2. Cardiogenic – failure of pumping action by the heart causing inadequate circulating blood volume.
3. Vasogenic or low resistance shock – widespread vasodilation causing increased capacity of circulation. Existing blood volume, even if it is normal, becomes inadequate.

Septic – caused by overwhelming infection

Anaphylactic – severe allergic reaction produced by the injection of a protein to which a person is sensitive, e.g penicillin, anaesthetic agent.

Neurogenic – loss of sympathetic control (nervous system), can result from spinal anaesthesia.

Treatment

1. The patient should be laid flat, preferably in the head down position. This helps supply more blood to the brain.
2. Depending on the type of shock the volume of circulating blood should be increased as quickly as possible, by setting up intravenous infusion.
3. Venous blood should be taken for grouping and cross matching in severe cases of hypovolemic shock.
4. Fluids to be administered ringer lactate or 0.9 normal saline in to be instituted until medical help arrives.
5. Injection adrenaline 1 amp subcutaneous is the drug of choice in anaphylactic shock.

Summary

The major systemic complications of asthma, diabetes, hypertension, cardiac arrest and shock have been described. Management by OA of the above is described. Majority of patients coming to eye hospital may not have these complications. But OA must have this knowledge.

Key points to remember

- *Asthma can be chronic or acute*
- *Medications are available to treat asthmatic attacks*
- *Diabetes is common in eye hospital patients*
- *OA should have a thorough knowledge of symptoms and treatment*
- *Hypertension may lead to serious complications in the eye and the whole body*
- *Hypertension must be constantly monitored and controlled*
- *Cardiac arrest is a life threatening condition*
- *Resuscitation must be started immediately*
- *Shock has many causes*

Student exercise

Say True/ False

1. *Asthma can only be chronic.*
2. *No medication is available to treat asthmatic attacks.*
3. *Diabetes is common in the eye hospital patients.*
4. *Hypertension must be monitored occasionally*
5. *Cardiac arrest is not a life threatening condition.*

Answer the following

1. *Why should OA be concerned about surgical patients with asthma?*
2. *Why it is necessary to check blood sugar for diabetic patients?*
3. *List the steps to be taken upon finding a collapsed patient.*
4. *List three causes of shock.*
5. *List three medications in the emergency drug box and their uses.*

CHAPTER 12 OPHTHALMIC SUB SPECIALTY NURSING CARE

CONTENTS

Cataract and Glaucoma
Retina
Cornea
Orbit
Paediatric ophthalmology

GOALS

To enable the ophthalmic assistant to be familiar with the instructions given to postoperative patients.

OBJECTIVES

The OA will be able to give post operative instructions who have undergone

- Cataract and Glaucoma surgery
- Retina surgery
- Cornea surgery
- Orbit surgery
- Paediatric cases

CHAPTER 12

Ophthalmic Sub Specialty Nursing Care

Cataract and glaucoma

Postoperative instructions to cataract and glaucoma patients

- Verify the case sheets and understand the type of surgery performed on the patient. Accordingly, give the medicines and clearly instruct about the usage of the drugs.
- Give the right medicine to the patient immediately after the patient is brought to the room after surgery.
- Communicate with the patient and comfort the patient if suffering from pain. Make them feel happy about the surgery.
- Prepare a sterile dressing tray for postoperative dressing in field setting.
- Know the details of postoperative care of cataract
- Know various postoperative complications and be able to institute their management as eye surgeon advises.
- Fill prescription of drugs and other specific instructions in the discharge slip for doctor's signature.
- Verify the type of surgery undergone by the patient and accordingly instruct the home care procedures at the time of discharge.
- Explain the drug administration and confirm the follow-up visit between the ophthalmologist and the patient.
- Help in getting reimbursement forms duly signed by the institution whenever patients demand.
- Take measures for preventing postoperative cross infection in the camp.
- Patient should be instructed to take liquid food and their tablets after the surgery.
- Before giving the tablets the OA should confirm with the patients whether they have allergy to the medicines. If the patient is allergic to the medicine, the doctor should be informed and get the alternative medicine.
- Regular food can be taken
- The patients are instructed not to lie on the side of the operated eye ;for example if the left eye is operated they should not lie on the left side but can lie on the right side. They can be in supine position. They can walk, talk, and do routine work as usual.
- The patients are instructed to take rest after the surgery and to take the tablets as per the doctor's instruction. The glaucoma patients should continue their regular medicines.
- After the doctors rounds, the condition of the eye after the surgery will be explained to the patients.
- Bandaging the eye should be demonstrated and taught to the attendar and the patient.
- Body wash can be taken from the next postoperative day. Head bath is allowed after 15 days (PHACO patients) and 1 month (IOL patients) . Depending on the type of implant the instruction for bathing could be changed. Eye cleaning can be done without using soap. Cotton ball has to be dipped in warm water, squeeze it and clean the outer area of the eye without pressure. Clean gently. Oil can be applied to the hair, combing can be done as usual.
- For male patients self-shaving can be done.
- Patient should avoid being in smoky and dusty places and avoid giving strain by frequently watching TV and reading books.

- Dark glasses should be used in the daytime for one month.
- At night time the patient has to wear bandage with shield for 5 days.
- Eye cleaning and instilling eye drops procedure is taught to the patient.
- Instilling eye drops procedure: Before instilling the drops the hands should be washed thoroughly, then the lower lid should be everted and two drops are instilled and eye has to be closed.
- Eye cleaning procedure: Cotton is to be dipped in the warm water and squeezed well. Then the lid margins and surrounding of the eye is to be cleaned with the cotton.
- Billing procedure, reimbursement procedure and other doubts about charges should be explained
- Follow up date is given. Timing can be given according to the patients' convenience.
- Timing for the discharge should be informed earlier.

Retina

1. The patient's blood pressure and pulse should be checked after the surgery.
2. Antibiotic and painkiller tablets will be given to the patients after ½ an hour.
3. For the first four hours liquid diet will be suggested for the patients.
4. Medications are given to the patients if there is any complication like vomiting and pain.
5. If the patients were given SOI / C3F8 / SF6 / AIR then the patients are to lie in the prone position. After 5 hours the ophthalmologist will check the intra ocular pressure in the eye. If the intraocular pressure is high then antigluacoma medicines are to be started.
6. According to the surgeon's instruction the patients will be positioned after the surgery.

Post operative instructions

1. Medication

- Patient has to follow the instructions on applying drops as given by the OA at the time of discharge for a period of 30 days.
- The patient should apply drops after washing their hands thoroughly
- In addition to eye medication, patients with diabetes, high B.P. heart disease and asthma should continue their medicines regularly.

2. Instruction concerning eye

- The patient has to protect the eye with green shade for 40 days and wear the black glass for the day time.
- Redness, watering of eyes and a little irritation are common and the patient need not worry about it. But if it is unbearable it is best to consult an ophthalmologist.
- Instruct the patient not to rub the operated eye

3. Body wash

- Body wash can be taken from the next postoperative day. Head bath could be taken after one month.

4. Food

- Regular food can be taken except the hard foodstuffs that are to be avoided.
- Tobacco chewing, smoking and taking alcoholic drinks are strictly prohibited.

5. Activities

- Walking, reading, writing, watching T.V. etc. should not be performed.
- Jumping, swimming, lifting heavy objects, cooking, gardening, yoga, should be avoided during the first month after surgery.

- Avoid playing games like basket ball, football, cricket and tennis for a certain period of time.
- Self-shaving is allowed after 2 weeks.

Special instruction

- The patients who were given SOI / C3F8 / SF6 / AIR should lie in the prone position for 15 days.

Cornea

Corneal transplantation and corneal suturing

1. Medication

- Follow medications as per ophthalmologist's instruction.
- Close the bottle (antibiotic drops) after use and store it in a cool place.
- In addition to eye medication, patients with diabetes, high B.P. heart disease and asthma should continue their medicines regularly.

2. Instruction concerning eye

- Do not rub the operated eye.
- Any discharge from the eyes should be wiped gently with sterile cotton. The cotton should be placed in boiled warm water for 10 minutes, cooled, squeezed and then be used.
- Do not lie on the side of the operated eye, because it should not be subjected to pressure or stress.
- Wear dark glasses during the day and green shade during night for the first 4 weeks
- If symptoms like redness, profuse watering, pain and reduced vision occurs in the operated eye, consult an ophthalmologist.

3. Face wash

- The face should not be washed for seven days. A soft wet towel should be used to wipe the face without rubbing the operated eye.

4. Activities

- Shaving can be done.
- Normal activities like walking, reading, writing, watching T.V. etc., can be performed.
- Jumping, swimming, lifting heavy objects, cooking, gardening, yoga, should be avoided during the first month after surgery.
- Avoid playing games like basketball, football, cricket and tennis for a year after surgery.

5. Bath

- After surgery, body bath can be taken daily and head bath after one month.

6. Food

- No diet restriction except in diabetics.

7. Special instruction

- If any other health problem arises, consult a physician immediately.

8. Follow up

- Come for the first follow up after a month and then confirm the second follow up date.

Pterygium transplantation, bowman's catery, excision piopsy & pterygium excision

General instructions

- Do not rub operated eye
- Cleaning: Any discharge from the eyes should be wiped gently with sterile cotton. (Put the cotton in boiling water for 10 minutes, cool, squeeze and then use it).
- Do not wash your face for the first 7 days; use a soft wet towel instead to wipe the face.
- Shaving can be done.
- After surgery, take body bath daily and head bath after 10 days.
- Do not lie on the side of the operated eye, because it should not be subjected to pressure or stress.
- Normal activities like walking, reading, writing, watching T.V. etc., can be performed.
- Jumping, swimming, lifting heavy objects, cooking, gardening, yoga, should be avoided during the first month after surgery.
- Avoid playing games like basketball, football, cricket and tennis for a year after surgery.

- No diet restriction except in diabetics.
- If any, other health problem arises, consult a physician immediately.

Corneal ulcer

Counselling and instructions

- The patient is instructed to take only body bath.
- The OA will give the medicines according to the ophthalmologist's prescription.
- Cleaning: Any discharge from the eyes should be wiped gently with sterile cotton. (Put the cotton in boiling water for 10 minutes, cool, squeeze and then use it).
- Drops should be applied after washing the hands.
- Food: No diet restriction except in diabetics. Diabetic patients should control their sugar level.
- If any other health problem arises, consult a physician immediately.

Orbit

Post operative instruction and care

Monitoring

- The patient's blood pressure and pulse should be checked after the surgery.
- The OA should check for bleeding or edema in the operated eye.

Medication

- Antibiotic and painkiller tablets are given to the patients half an hour after the surgery

Patient counselling

- Patients should take normal food except hard foodstuffs.
- The OA should enquire the patients regarding allergy to any medicines.
- The patient should be told that the suture will be removed after 5 days.

DCR patients

- The patients will be fitted with nose pack which will be removed after 24 to 48 hours. The patient should not remove the nose pack.
- The patient should be instructed to breathe through their mouth as they cannot breathe normally through nose due to nose pack.
- They should lay on a flat surface and not use pillow
- They should avoid coughing and sneezing because this may lead to bleeding through the nose. Notify the doctor immediately in case of nasal bleeding.

Evisceration

- For evisceration patients the OA assists the ophthalmologist in removing the betadine pack.
- Instructions are given to the patients regarding cleaning the eye and medicine intake.
- Cleaning: Any discharge from the eyes, should be wiped gently with sterile cotton. (Put the cotton in boiling water for 10 minutes, cool, squeeze and then use it).
- The patient should not rub the operated eye and wound.
- Tobacco chewing, smoking and taking alcoholic drinks are strictly prohibited.
- Self-shaving is allowed after 2 weeks.
- The patient should continuously wear the green shade for 15 days. Once in two days the green shade should be washed using medicated soap.
- After 15 days the patient can take head bath.
- Patient has to consult the ophthalmologist after 30 days.

Paediatric ophthalmology

Post operative care

- Receive the patient from the operation theatre
- Maintain clear airway

- Maintain proper position
- Check the vital signs
- Recognize the immediate complications, both ocular and systemic and inform the ward doctor
- Check patient passes urine after surgery
- Management of acute emergencies like administration of O2
- Instruction to the parents regarding feeding, possibility of vomiting in cases of GA patients, systemic medication (injections or oral) as advised
- Assisting the ward doctor in examination of the children
- Taking care of application of medications as advised by the ward doctor
- Discharge summary with the postoperative instructions according to the case sheet.
- Follow up date for the next visit
- Additional care to ensure complete satisfaction of the parents
- Report any problem to the concerned doctor

Summary

The outcome of the surgery is dependent on the post operative evaluation and treatment. Clear instructions to the patient will give the best outcome. Printed instructions should be given to the patient for reference at home.

Key points to remember

- *OA must make the patient aware of following instructions completely for optimum surgical results*
- *OA will instruct the patients to use medications appropriately*
- *OA must be aware of different instructions to speciality patients and ensure that the correct instructions are given and understood by the patients.*
- *Importance of follow up visits is stressed to the patient*

Student exercise

Fill in the blanks

1. *Postoperative cataract and glaucoma patients may take bath after---------------days.*
2. *Patient should not carry heavy weight at least for ------------days.*
3. *Before instilling eye drops hands should be -----------------*
4. *Postoperative retina patient should have their -------------and -----------checked after surgery.*
5. *Avoid playing games like ----------------and -------------- after retina surgery.*

Answer the following

1. *State the details of postoperative care for cataract patients.*
2. *Explain how the patient is to lie in the bed after retina surgery.*
3. *Discuss restrictions in the diet after surgery.*
4. *Write short notes on:*
   A. Nose pack
   B. Instructions for corneal ulcer patients
   C. Paedeatric postoperative care
5. *State the importance of follow up visits for the patients.*

CHAPTER 13 MANAGEMENT STRATEGIES IN IN-PATIENT SERVICES

CONTENTS

Introduction
Patient care
Roles and responsibilities of OA
Records and registers
Monitoring mechanisms
Communication system and interdepartmental links

GOALS

To enable the ophthalmic assistants to maintain the ward efficiently

OBJECTIVES

The OA will be able to

- Provide highest quality nursing care for patient
- Provide a clean, well ventilated environment for the patient and protect him from infection, accidents and hazards
- Help the staff in achieving the highest degree of job satisfaction
- Provide facilities to meet the needs of patients and their attendants
- Maintain necessary records and registers
- Communicate effectively within the department and with other departments

CHAPTER 13

Management Strategies In In-patient Services

Introduction

An overall plan for the OA nursing department provides for establishment of a number of units or wards. So the process of administration must enter into these wards.

Factors involved in good ward management

i. Planning

- A planned program for each day's work
- Provision of supplies and equipment for efficient work
- Well planned assignments
- Delegation of responsibility

ii. Scheduling

- Beginning the day on time
- Preventing interruptions
- Establishment of ward routines
- Well arranged time for personnel

iii. Data management

- Accurate record keeping
- Full reports

iv. Motivation

- Establishment of good working relationship within the ward and with other associates
- Maintenance of high morale among all members of the staff

v. Strategy management

- A thorough knowledge of all duties performed in the wards.
- Use of democratic methods in establishment of ward policy
- Orientation of new staff members
- Maintenance of a suitable environment
- Clear understanding of doctors' orders
- Good teaching and supervision

Components of ward management

- Patient care
- Personnel management
- Supplies and equipment
- Environment cleanliness

Patient care

This includes all activities necessary to provide nursing care concerned with comfort and well being of every patient. It is necessary to assess the needs of the patients and plan for their recovery. Helping physician in carrying out procedures, preparing equipment for assisting physician with diagnostic tests and therapeutic measures of OA leads to patient care. Giving medicine and carrying out treatment, observing patient for any untoward reaction following treatment and making necessary measures to combat them also play an important part in patient care. The ward manager is in charge of the smooth running of all preoperative and postoperative requirements.

a) Personnel management

Assignment of OAs for patient care can be given according to the number of patients. Allocation of personnel is done to fulfill the immediate needs of the individual hospitals, for example the paying section, speciality section, free section and camp section. The Management must make sure that the ward rounds are done as per the norms. Ward round is a tool of supervision, evaluation and teaching. The ward should have a sufficient number of cleaners to keep the ward clean and tidy. They should be supervised effectively.

b. Supplies and equipment

Ensure that all supplies and equipment as listed in unit I are on hand in the ward. If there is any problem with the equipment, it should be rectified by sending either to the maintenance department or calling the technician to take steps to repair it. OA must be sure that there is sufficient medicine in the ward.

c. Environment cleanliness

Cleanliness in the ward is essential for good patient outcome. Everyone contributes to maintaining the cleanliness of the ward.

The OA should ensure cleanliness of all areas. If problems are found, the housekeeping department should be informed immediately and rectify the problem. A checklist must be followed daily for the proper maintenance of the ward.

Dustbins must be kept inside the patient's room as well as outside in a few places, so that bits of paper , used cotton and other waste will not be strewn around. Toilets and bath rooms are cleaned at regular intervals.

Roles and responsibilities of OA

Preoperative and postoperative care is a critical component of nursing for it determines the patient's state of mind before surgery and attitude towards the hospital. OAs in the wards are responsible for ensuring continuity of ophthalmic care before and after surgery, and for providing physical and psychological support to patients during their stay. They have the major responsibility from the time patients are admitted till they are discharged.

Their various roles are outlined below

Patient interaction

- Ensuring that the physical, mental and medical requirements of patients admitted for surgery are met.
- Entering patients name, medical records number, time of admission, receipt number andother relevant details in admission and discharge slip.
- Giving orientation about the room to patients.
- Providing preoperative and discharge instructions to patients.
- Accompanying patients for checkup by the ward physician.

Monitoring

- Rechecking preliminary investigations before surgery
- Check that all patient details are in order
- Confirm availability of right IOL Diopter (especially unusual powers)+/- 8.00-23.00

Execution

- Administering medications conscientiously
- Pre rounds preparation
- Sterilization of equipment and instruments
- Routine change of linen in rooms
- Leading pre and post operative patients to medical officers at wards for eye check-ups
- Attending phone calls, complaints and doing the needful. Inform the surgeons about complicated cases

Assisting

- Assisting the ward ophthalmologists in slit lamp examination of patients the day after surgery
- Assisting the ward ophthalmologists in keratometry and A-scan examination before surgery

Documentation

- Enter the patient information, MR number, advance receipt number, time of admission and discharge
- If the patient is scheduled for surgery, write down their name in the surgery schedule list, MR number, type of surgery etc
- Write discharge instructions in the pad
- Daily morning find out the bed census and write down in a note book and also on the notice board. Bed census contains the following

Total number of beds

Total number of occupied beds

Number of vacant beds. It is calculated by adding the admission and deducting the discharge.

- Maintain surgery note book. It contains the name of the patient, MR number,room number and type of surgery.
- After surgery, the type of surgery and name of the surgen is added and this is helpful in taking surgery statistics.
- Preparing the census report and attending the meeting weekly.

Role of ward incharge

Monitoring

- Checks whether advance is paid or not.
- Checks that patient details (Name, MR. No, and Room. No, Surgery details…) are entered in admission register.
- Checks that medicines are purchased.
- Maintains the bed census board in the floor.
- Cross checking the bed census report generated in ward with that generated in the admission and discharge counter.

Patient interaction

- Discharge instructions are prepared and given to patients (discharge counselling)
- Patient queries and requirements are addressed

Documentation

- Surgery list is prepared and distributed.
- Discharge summary is prepared.
- Entering follow-up dates and time in the register after consultation with the patient according to their availability.
- Relevant medical and reimbursement certificates are prepared and issued to patients.

Communication

- Inform surgical complications to the surgeons.
- Follow up the out -going interdepartmental consultations

Role of ward ophthalmologist / OA / Manager

- Performing examination to reconfirm all test findings and correlate with records.
- Supervising administration of preoperative medications.
- Checking with the patient for past history of sensitivity or allergy to anesthetic agents.
- Deciding on type of anesthesia (local / general) the patient will need depending on patients age, physical and mental well-being.
- Devoting special attention to complicated and high risk patients.
- Obtaining physicians certificate of fitness for patients with systemic problems.
- Ensuring that appropriate identification stickers are placed on the case file covers for patients with any systemic problems or allergies.
- Post-op review of all patients.
- Ward rounds and discharge of patients.
- Medical reports / certificates.
- Review of any surgical complications.
- Gives a written report to the night duty doctors on any patient who need extra care or injections. The OA should keep these patients' case sheets accessible to the duty doctors.

Role of ward housekeeper

Cleanliness

- Ensure that the ward is kept clean.
- Planning and procurement of cleaning materials required for hospital is done.
- See that the ward is decorated with appropriate wall hangings, photos and flower arrangement.

- Wall hangings, doors and windows, furniture are all cleaned regularly
- Bed covers are kept clean and appropriate colors are used in different rooms.

Documentation

- Inventory list of furniture, electrical equipment, plumbing and carpentry materials.

- The required inventory of cleaning materials is maintained and transferred to the required area when required.
- The linen stock is maintained.

Appliances

- Tube lights, fans, buckets and other amenities are repaired and replaced as required

Records and registers

Admission register

Room NO	MR. No	Patient name	Date of admission	Surgery detail	Systemic diagnosis	Blood Sugar value	BP – forenoon & afternoon	Remarks

Iol review register

Date	MR. No	Patient name	1st review date	2nd review date	Time	Remarks

Phaco follow up register

Date	MR. No	Patient name	Review date	Time	Remarks

Reimbursement register

Date	MR.No	Patient name	Advance receipt number	Discharge bill number	Medicine bill number	Ward OA signature	Number of bills	Patient's signature

Reports generated

1. Follow up note

A follow up note is prepared daily and sent to medical records department from the ward to facilitate retrieval of case sheets prior to the arrival of patients the next day, so that waiting time is reduced.

2. Handing over and taking over

This report is prepared everyday by day duty ward assistants and handed over to the night duty ward assistants. It deals with information regarding patients with systemic problems. It will help in paying special attention and care to patients who are at risk. Also the vital signs are taken, noted, and entered by night duty sisters so that it can be reviewed during examination the following day.

3. Discharge report

A list of patients discharged is prepared everyday by the ward coordinator and sent to the admission and discharge counter to let them know the room vacancies as well as the telephone utilization. It enables the admission and discharge counter to reallot the vacant rooms to new patients and also to include telephone charges in the bills for discharged patients.

4. Microbiology test requisition form

A test requisition form is sent from the ward by the in charge to the diagnostic laboratory in case any investigations are completed.

5. Ward census report

Ward census report is prepared twice a week that is on every Tuesday and Saturday. This helps cross checking information entered in ward with that of admission and discharge counter. Details regarding settlement of bills, with information about addition or deduction of rental charges in the bills of patients who had shifted their rooms are also given.

Monitoring mechanisms

The following activities need to be monitored

1. Patient flow and arrival: Patient arrival should be anticipated and required room type and the bed should be ready before patient arrives.

   Register to be maintained of patients present and new patients admitted
2. Supplies and equipment: Weekly checking of the stock of stationary and drugs. Weekly checking of the functioning of all equipment and reporting if there is any flaw.
3. Staff attendance, performance and discipline: Daily monitoring the attendance of staff and to make necessary substitute arrangements for absentees. Punctuality of the staff is also monitored.
4. Cleanliness of the ward: Daily monitoring the cleanliness of the wards, rooms and waste transport and disposal. Daily checking of the bed, linen and other supplies in the rooms and also the interior decorations of the rooms.
5. Patient feed back and suggestion: Taking patient feedback on the quality of care.

The following meetings are conducted to monitor the functioning of the department

i. Weekly meeting: A weekly meeting is conducted by the nursing superintendent where several issues like postings, classes for trainees, work related problems, patient satisfaction, and any other complaints are dealt with. This will be attended by ward in charge of all floors, and OAs. Ensure that any corrective measures needed are undertaken to facilitate proper functioning of the department.

ii Quarterly meeting: Once in three months infection control meeting is conducted which is attended by ophthalmologists, nursing superintendent, operation theatre OA , ward OA. This is to help prevent the chances of infection by any means.

Communication system

Telephone intercoms are the most common communication mode in the hospital. Intercoms can be used as a mode of communication within the department or within different departments. Intercoms can also be useful for the external customers like the patient or the patient attendants to get the regular information of the hospital. This method needs a telephone operator or a receptionist to receive calls and to transfer the calls to the respective extensions. This method of communication reduces the delay in the transfer of a message either inter departmental or intra departmental level.

Other methods of communication are the reports or the requisitions sent from one department to another or within the department such as

- Indent from ward to the stores for supplies.
- Lab requisition from ward to lab for the specific test to be done.
- Prescription to pharmacy and to the patient.
- Discharge summary to patient.
- Registration number or MRD number communicates details regarding the patient to all the departments.

a. Inter departmental links

i. Housekeeping

Housekeeping is a non - revenue producing service department in the hospital. It helps in providing a clean, comfortable and safe environment in the ward, which ultimately ends up in patient satisfaction. Smaller hospitals may find it difficult to have a separate house keeping department, so they entrust the responsibility to one or a few persons.

ii. Maintenance department

This department helps in keeping furniture, fixtures and facilities in ward in working order. It also takes care of plumbing, carpentry, electricity and civil works in the ward.

iii. Operation theatre

Operation Theatre is directly related with ward because an operated patient is admitted for a minimum three hours (day care). This relationship will help in providing better care to the patient.

iv. Personnel

Ward coordinates with personnel department for recruitment, salary, administration, identity cards for staff, promotions and exit formalities.

v. Catering

Catering department takes care of the food requirements of patients admitted to ward. They can supply food in the rooms itself as per the order given. Special foods for diabetic patients should also be made available. Catering department could be established in hospitals if they feel the necessity of it.

vi. Stores

The coordination with stores ensures the availability of day to day requirements of the wards. Materials can be indented from stores in daily / weekly / monthly basis according to the requirement. The medicines used in surgery are replenished by patients who will purchase the same from pharmacy and hand over them. These will be sent to the main stores.

vii. Medical records department

A healthy relationship with the MRD will allow smooth receiving and providing all the needed information and data that are closely related with patient care during their stay in the hospital and also during the revisit.

viii. Pharmacy

With the help of pharmacy the ward is able to function efficiently by providing all the necessary medication to the patients round the clock.

Summary

Strategies for managing patient care, ward rounds and ward environment have been discussed in this unit. Registers and records are to be accurately maintained in the ward waste disposal should be effectively done, to prevent and control infection. This also contributes to patient satisfaction.

Key points to remember

- *Most of the patient's interaction will be with the OA*
- *Their knowledge and attitude is very important to the patient's overall experience*
- *They play a pivotal role in the smooth functioning of the ward*
- *Records and registers are to be maintained to generate accurate and necessary reports*
- *The OA interacts with the housekeeper to guarantee a clean and pleasant environment*

Student exercise

Answer the following

1. *List ten factors involved in good ward management.*
2. *Describe the duties of ward manager.*
3. *Which investigations must be rechecked before cataract surgery?*
4. *What is the role of ward house keeper?*
5. *What are the records and registers maintained in the ward?*
6. *Discuss the communication system within the hospital.*

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