OPERATIVE OPERATION THEATRE

EYE OPERATION THEATRE

Prevention Is Better Than Cure

A MANUAL FOR EYE OPERATION THEATRE

SEWA RURAL, JHAGADIA

(2008)

Hippocratic Oath

I swear by Apollo Physician, by Asclepius, by Health, by Heal-all, and by all the gods and goddesses, making them witnesses, that I will carry out, according to my ability and judgement, this oath and this indenture.

To regard my teacher in this art as equal to my parents ; to make him partner in my livelihood, and when he is in need of money to share mine with him; to consider his offspring equal to my brothers; to teach them this art, if they require to learn it, without fee or indenture; and to impart precept, oral instruction, and all the other learning, to my sons, to the sons of my teacher, and to pupils who have signed the indenture and sworn obedience to the physicians' Law, but to none other.

I will use treatment to help the sick according to my ability and judgment, but I will never use it to injure or wrong them. I will not give poison to anyone though asked to do so, nor will I suggest such a plan. Similarly I will not give a pessary to woman to cause abortion. But in purity and in holiness, I will guard my life and my art. I will not use the knife on sufferers from stone but I will give place to such as are craftsmen therein.

Into whatsoever houses I enter, I will do so to help the sick, keeping myself free from all intentional wrong doing and harm, especially from fornication with woman or man, bond or free.

Whatsoever in the course of practice I see or hear (or even outside my practice in social intercourse) that ought never to be published abroad, I will not divulge, but will consider such things to be holy secrets.

Now if I keep this oath and break it not, may I enjoy honour, in my life and art, among all men for all time; but if I transgress and forswear myself, may the opposite befall me.

OPERATIVE OPERATION THEATRE

A MANUAL FOR
EYE OPERATION THEATRE
PREPARED BY
SEWA RURAL TEAM

SEWA Rural, Jhagadia

(2008)

This operation theatre protocol book has been specifically prepared for all the Ophthalmologists and other staff members particularly working in the operation theatre. We very much appreciate the financial assistance given by the Department of Health, Govt. of Gujarat in an attempt to print the manual and spread the information on the infection control measures among concerned staff.

It is hoped that all the Ophthalmologists, operation theatre staff etc. will make extensive use of this book to bring down the post operative infection rate following cataract surgery. However, this manual is only a guideline and it is expected that all the hospitals will develop their own guidelines based on their requirements.

No. of copies: 2000

Year of publishing: 2008.

Published by:

SEWA rural
Jhagadia- 393 110.
Dist. Bharuch
Gujarat.
Phone: 02645-220021 / 220868
Fax: 02645 220313
E-mail: sewaruraljhd@bsnl.in
Website: www.sewarural.org

Printers :
Lipi Offset
Surat.

THIS BOOK IS DEDICATED TO

PATIENTS WHO HAVE LOST THEIR EYES

AFTER CATARACT SURGERY

BUT

HAVE BECOME THE TORCH BEARERS

IN SAVING THE EYES OF FELLOW MEN.

सत्यमेव जयते

Commissionerate of
Health and Family Welfare
Block no. 5, Jivraj Mehta Bhavan
Gandhinagar 382 010
Date 10.04.2008

FOREWORD

India has the largest cataract backlog in the world. Under the National Programme for Control of Blindness, we are trying to increase the output in the country. Despite scarce resources, India has done well in the last decade. We have emerged as one of the leaders in eye care in the world!

However, we keep hearing about cluster infections time and again. This is despite rapid progress in the knowledge and understanding of the science of asepsis and anti sepsis in the last few years. The rate of infection after cataract surgery has come down drastically in western countries.

We need to make concerted efforts to bring down the post operative infection rate in India also. Gujarat is number one in the performance and is now taking the lead in infection control and operation theatre protocol measures by organizing workshops region wise across the state.

This book has been prepared by the expert team at SEWA Rural especially for the Ophthalmologists and staff working in the eye operation theatres. They have worked hard to incorporate minute details by consulting the available literature & interacting with the experts in the field. It gives elaborate information about the methods and monitoring of the activities within the operation theatre complex.

I am sure this book will prove very useful to all the Ophthalmologists and other support staff. I am confident that with active involvement of all, we will be able to move in the direction of curtailing the post operative infections in eye surgeries in coming years.

With best wishes,

10th April 08

(Dr. Amarjit Singh)
Commissioner.

PREFACE

It is a pleasure for my colleagues & myself to share our protocol about preventing & managing post operative infection in cataract surgery.

SEWA Rural is a voluntary development organisation working for the over all development of the community mainly poor people of tribal area of Bharuch & Narmada districts since last 27 years. The spectrum of activities includes 100 beds general hospital, Comprehensive eye care programme, Community health programme, Training centre, Vivekananda Gramin Tekniki Kendra and women's programmes.

The Comprehensive Eye Care programme includes rehabilitation and integrated education for the incurably bind children. The eye department caters to the eye care needs of over 2.5 million population around Jhagadia. About 50000 patients in OPD including base hospital and outreach activities are examined and about 6000 eye surgeries are performed every year. The base hospital is equipped with tertiary care facilities like YAG laser, diode laser, automated perimeter, A-B scan, fundus camera, phacoemulsifier etc.

We had an episode of cluster infection in the year 2004 following cataract surgeries at our base hospital in Jhagadia. After thorough literature search and interaction with the experts in the field, we developed a protocol for our hospital including minute details. We then extensively oriented all the staff members including Ophthalmologists. The post operative rate of infection in our hospital has come down below 0.1% after following this protocol.

Sightsavers International, providing funding to our eye care programme got interested into this protocol. They asked us to evaluate other partner hospitals in light of this newly developed protocol. Getting involved in this evaluation exercise for 18 hospitals across the country, we have realised that the understanding & implementation about the recent advances in infection control measures is lacking in most of the places.

This book is published to educate everybody including Ophthalmologists & other supporting staff involved in the eye care to make sure that the rate of infection following cataract surgery is brought down as much as possible.

We express our sincere gratitude to our patients for providing us this opportunity to serve them better and better.

April 08
SEWA Rural, Jhagadia

Dr. Lata Desai
Managing Trustee

INTRODUCTION

Every five seconds one person and every minute one child goes blind in the world. There are about 45 million people blind and 135 million visually impaired in the world. The total blindness is increasing every day with increasing population. Out of this 90% are in developing countries and 80% blindness is avoidable blindness. We have more than 9 million cataract blinds in India, the highest in the world.

India has done well in last few years in eye care and the total performance of cataract operations has also increased substantially. The Vision 2020 Programme launched recently is also providing impetus to the whole National Programme for Control of Blindness. However, we still have a major resource crunch as far as trained manpower is concerned both among Ophthalmologists and among paramedics. We are trying to do maximum work with the help of available manpower. The average performance of an Ophthalmologist is merely 400 which we need to raise quickly.

The technology in cataract surgery has advanced rapidly. With the advent of Small Incision Cataract Surgery, it has become quick and safe. However, we keep hearing about the incidence of cluster infection in different parts of the country every now and then. Often it does not come to light for one reason or other. Unfortunately, the infection control measures are overlooked during the medical education and hence most of us do not know its exact details. The science of asepsis and anti sepsis has advanced rapidly in last couple of decades and today, the rate of infection in cataract surgery in developed countries has come down to less than 0.01%. However, it is bound to remain somewhat on the higher side considering the given limitations in India, particularly in rural area and public hospitals, like dust, heat, humidity and poor hygiene etc. in addition to lack of trained manpower.

We are faced with a dilemma; on one hand we need to increase the work output to achieve the targets of Vision 2020 laid down by ourselves with limited human and infra structural resources and on the other hand we have to bring down the rate of post operative infections in cataract surgeries. The corollary is like driving a loaded truck at a high speed maintaining full controls. The situation is understandably rather difficult.

Various causes of blindness include post operative complications. That does not speak good about the work that we are doing. We must make sure that we bring down the rate of post operative complications. One solution could be to prevent post operative infection by taking appropriate but systematic and stringent steps.

Patients and staff working in hospitals or clinics are at a risk of acquiring an infection unless proper preventive measures are taken. Nosocomial infections are major concerns for any hospital in the world and are on the rise. It is more so in the developing countries. It is stated that about 25% of the patients getting admitted in the hospitals in developed

countries and 50% in developing countries develop nosocomial infection. Everybody is fighting hard to bring down these figures.

Most of the infections can be prevented by strictly adhering to safe practices like hand hygiene, use of gloves, effective practices of decontamination of instruments and other soiled items and also by improving the safety systems in critical areas where chances of infection is high e.g. operation theatre.

We had an unfortunate episode of cluster infection in the year 2004. Following the painful episode, we did extensive literature search and interacted with many experts in the field. At the end present manual was developed mainly for our usage.

Sterilization is the complete destruction of all pathogenic micro organisms i.e. bacteria, viruses, fungi and spores. The word "sterile" means free from or the absence of all living organisms. All that cannot be sterilized have to be aseptic. Sterilization and aseptic conditions are vital to any hospital and more so, for the ophthalmic work. The maintenance of sterile conditions in a hospital is very essential and is not difficult. Trained manpower in combination with systematic planning, scheduling of duties and monitoring would achieve desirable results. Priority should be given to communicating as well as internalizing the importance of these practices. Policies and procedures should be kept in place and strict adherence to these should be followed.

The manual contains information about the common practices followed in maintaining the sterility of the operation theatre (OT) complex. The central sterile supplies department is responsible for the sterilization of equipments, instruments, surgical supplies, etc. The manual is aimed towards all who are involved in maintaining the sterile conditions in an ophthalmic operation theatre. It lists down the basic and acceptable practices followed. The practices could be modified according to the requirements of a given hospital within acceptable limits as well as available resources. We hope it will help all those involved in eye care to bring down the post operative infection rate in times to come.

I am indebted to my colleagues Dr. Rajesh U. Patel (Ophthalmologist) and Dr. Kalpana G. Shah (Anaesthetist) for their valuable contribution to make this manual possible, the whole team of operation theatre for pretesting the manual and giving important feedback and to the computer room staff for their support in DTP work.

April 08

Dr. Uday Gajiwala

SEWA Rural, Jhagadia

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OPERATIVE OPERATION THEATRE

INTRODUCTION

Surgical techniques in ophthalmology have advanced considerably & in the present time the Operation Theatre (OT) has become the most critical point of any hospital set up. The surgical procedure itself is the most important event that happens to the patient, proper management of this critical act requires a team effort. Each member of the team plays an important role in the overall success of the surgery. The structure of the operating room is as crucial as the functioning team.

Three most important reasons for developing post operative infection are;

- Touch
- Sterilisation failure
- Environment

(arranged in the order of importance)

This means inadvertent touch of scrubbed person or sterile item to unscrubbed person or unsterile item OR vice versa is the most important reason leading to post operative infection. Failure of sterilization either at our end or at the manufacturer's end for pre sterile items is second important cause. Environment is the third important reason.

- **Direct contact:** Nurse/ doctor touches the wound, does not wash their hands and touches another patient's wound.
- **Indirect contact:** Nurse's ungloved hand touched an instrument or a piece of equipment contaminated with blood or other body fluids, does not wash hands and then touch a point of entry in a susceptible host.
- **Droplet infection:** Colonized of infected person sneezes or coughs onto the face of a susceptible host.
- **Airborne transmission:** Droplet nuclei. The susceptible host inhales enough droplet nuclei to meet the infective dose.
- **Dust or lint particles:** Dust or lint particles float in the air, susceptible host inhales enough particles to meet the infective dose or enough particles land on a point of entry on a susceptible host.
- **Vector transmission:** Infection is transmitted via bite from fly, mosquito, flea etc.

From the above paragraph we can conclude that we have to develop the attitude so that we avoid inadvertent touch and at the same time ensure that the sterile items that we use are perfectly sterile. Simultaneously taking care of the environment to keep it as clean as possible.

It's a joint medico-nursing responsibility to prevent any member of the O.T. team from delivering pathogens to the O.T. & eventually the operative site.

The whole manual talks about how to make sure that we maintain the above three things at a bay and avoid post operative infections. We will start with the layout of the operation theatre.

(A) Operation Theatre Lay Out

Sterilization in the Operation theatre begins right from its construction, as an ideal theatre should be located away from the roadside, avoiding dust, noise and other contaminants. The most sterile section of the field is in the centre.

Modern day OT design incorporates zoning of areas within the Operation Theatre (OT) complex. Important aspects of any OT layout include location, design, proper ventilation and separation of the sterile zone and non-sterile zone. For strict asepsis, an eye OT should not preferably be shared with any other surgical discipline. The OT should have a separate opening towards a sterile area marked for instrument packing and sterilization.

Physical set up :

- Stone flooring (Marble should be avoided as it is porous material)
- Full wall glaze tiling (large size tiles so that minimum no. of joints are there)
- Epoxy painting which contains anti bacterial properties
- No false ceilings advocated
- No surfaces where dust can accumulate (Edges to be rounded)
- An air lock to be provided
- Air tight openings
- No openable windows inside the operating room

Air Cleaner

Air Curtain

Dehumidifier

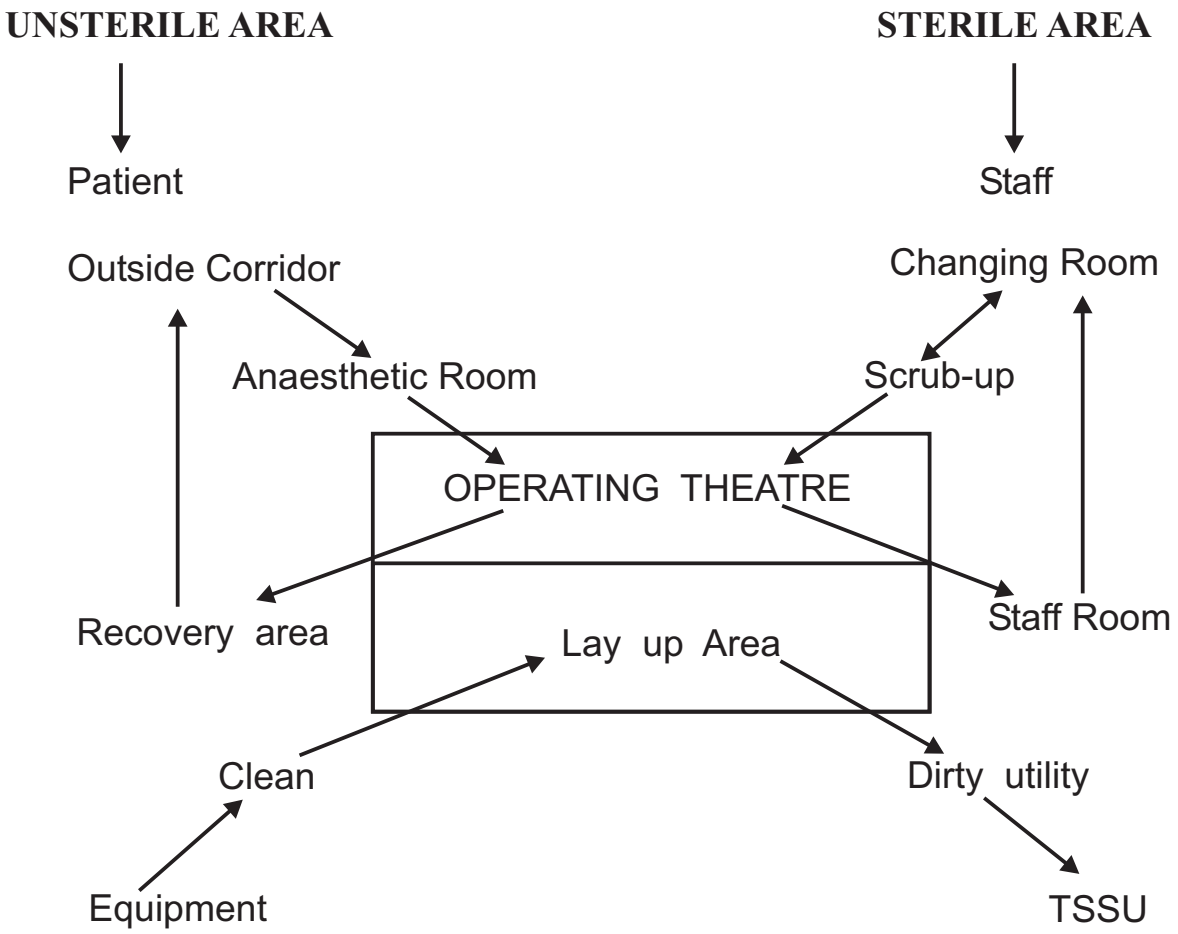
Ultraviolet Light

- No wooden furniture inside the operating room
- Separate entries for the scrubbed staff / sterile items and circulating staff / patients / unsterile items / waste disposal
- Maximum space to be allocated to the head end of the patient which is the sterile area
- Autoclave room to be away from the main operating room so that the moist heat generated in the autoclave room is kept away otherwise it is a rich medium for the growth of organisms.
- No ceiling fans inside the operating room.

Physical parameters :

- Well ventilated - where the circulating air is filtered through minimum 0.5 micron filter, better if 0.3 micron (HEPA) filter can be employed.
- If positive pressure ventilation can be created, it is still better but it is very costly.
- If laminar air flow can be employed, it provides vertical unidirectional flow on the operating table, that is next best but again it is costly.
- Minimum 15 air exchanges per hour are required which is not possible with window A/C, hence split A/C or central air conditioning is required.
- Class 100 air : highest ideal BUT for eye operation theatre, class 10000 air is considered good enough.
- Well fumigated and aerated theatre is necessary.
- Continuous air purifying through air purifiers should be available.
- Temperature 20-23° C.
- Relative humidity 30-60%.
- Air movements from clean to less clean areas.
- Air changes: minimum 15 total air changes per hour.
- Acceptable bacterial carrying particle (bcp) load < 180 / sq. mt.

Figure : SCHEMATIC DRAWING OF THE LAY OUT OF THE O.T.



Ventilation:

Air decontamination is important. The OT should be well ventilated and the circulating air should preferably be filtered. High Efficiency Particulate Air (HEPA) systems remove most micro organisms ranging in size from 0.3-5.0 microns. The principle of ventilation in the OT is the delivery of positive pressure filtered air in the vertical unidirectional flow over the operating table the Laminar air flow system. However, these are costly and may not be affordable to every hospital. They can employ air cleaners with filters of less than 0.3 micron size. Adding ultraviolet lights further helps in cleaning the room air. However, as the ultraviolet light is toxic to human beings, it is turned on when the last person is leaving the operating room and turned off when the first person enters the room. It continuously kills the micro organisms effectively when no activities are taking place within the operating room. Providing air lock before the main operating room helps the comparatively sterile operating room air to remain inside. Applying air curtain at the entrance may help by keeping the outside air outside.

Minimum split air conditioning unit is required as the operating room air must circulate through the filters in the air conditioning unit to make sure that 15 air exchanges take place in the operating room. Window air conditioners are not sufficient for the purpose. Central air conditioning units are better but costly.

In the surgical OT providing facilities for most forms of surgery, the recommended count of bacteria in air should not exceed l/ft.^{3} (3.53 m^3).

The major zones of an OT complex are:

A. **The outer zone:** This is a reception area and accessible to all persons and supplies.

B. **The clean zone:** This is the space for circulation of the OT staff after changing. It encompasses the

   1. Changing room: Located near the entrance of OT complex.
   2. Transfer Zone : Space for shifting of the patients.

C. **The aseptic zone:** This is the sterile area within the OT complex consisting of the

   1. Scrub and gowning area.
   2. Preparation room.
   3. The OT.

D. **The disposal zone:** This is the area where used equipments and supplies are processed. Disposal of biohazardous waste is also done in this zone.

(B) Pre operative Preparation :

1. Patient preparation :

- Preoperative assessment for the patient related factors. Septic foci in the body should be identified and treated before hand.
- No contact procedures like tonometry, sac syringing or A scan etc. should be done on the day of the surgery
- A complete bath to be given to the patient before surgery. If this is not possible, at least a complete face wash with soap will reduce the bacterial flora on the skin around the operating site.
- Preoperative use of prophylactic antibiotics. Loading doses of topical antibiotics and frequent application have been found to provide prolonged therapeutic levels in the cornea and the aqueous humour.
- Topical use of 5% povidone iodine one drop on the previous day and one drop in the morning before surgery will reduce the conjunctival flora comparable to the use of antibiotic topically and is strongly recommended.
- Trimming of the cilia: Although cilia trimming were once considered to be helpful in reducing postoperative infection, the present trend is not to trim cilia for the intraocular surgery. This has followed the wide spread practice of isolating lashes with sterile adhesive plastic drapes.

2. Personnel preparation :

Proper design and maintenance of operating room is important to prevent transportation of micro organisms. Person who enter the operating room suite, contains large quantities of bacteria, in the nose and mouth, on the skin and on the attire, which may contribute to serious infections. Measures should be taken in order to follow the regulations in maintaining the operation room as clean as possible. It is also essential to maintain the theatre discipline and to avoid unnecessary talking or movement in the theatre.

➢ **Attire :**

The attire worn in the restricted surgical areas should be made of proper materials that meet with the standards. The apparel should be made of closely woven fabric and should cover as much skin as possible to prevent dispersal of bacteria. The attire for the operating room should not be worn outside the operating room department.

➢ **Caps and Mask :**

The traditional mask of four to six layers of muslin offers very limited protection. When first worn it may be reasonably efficient, but soon becomes saturated with moist vapour from the wearer's breath.

More efficient masks are of high filtration disposable type. Several brands are available, any may be used. These masks can be moulded to facial contours and actually filter the respiration as compared to deflection with paper or cellophane insert masks.

Such masks achieve 98 percent efficient filtration compared with only 40 percent with muslin mask.

- **Procedure for using a mask :**
  1. When wearing the mask, care should be taken to see that the nose, mouth and facial hair are well covered.
  2. Masks should be changed at least every operating session and should never be worn "around the neck".
  3. Mask 'wiggling' is also a potential source of infection.
  4. When removing a mask, care should be taken to avoid touching the part which has acted as the filter. The hands can easily become contaminated with bacteria.

  Caps should be worn, as hair would harbour bacteria and if left uncovered, it would be a major source of infection. Hence care should be taken to cover hair completely.

❖ **Hand washing :**

Hand washing is one of the most effective methods of prevention of spread of infections. A liquid soap or an antiseptic should be used to cleanse the hands. A simple hand wash with liquid soap must be done at the time of entering the operation theatre in the morning and then every time under following conditions :

Conditions where hand washing is mandatory :

1. Prior to any clinical procedure.
2. Before and after dressing of a wound. This is followed even if gloves have been used.
3. Before and after handling of any patient and also between procedures on the same patient.
4. After handling of any contaminated articles such as urinals, bed pans etc.
5. Any situation where the hands look or even feel dirty. After personal use of toilet. Before and after consumption of meals.
6. Before entering and leaving any clinical area.

3. Instruments & Equipments Preparation :

Care of instruments

(i) Cleaning:

Special attention should be given to clean the surgical instruments before sterilization. Surgical instruments vary in configuration from plain surfaces, which respond to most types of cleaning to complicated devices that contain box locks, blind holes and interstices.

- Instruments should be cleaned as soon as possible after their use.
- Sharp and blunt instruments should be separated.
- **An ultrasonic cleaner** can be used for cleaning the instruments. It is ideal for cleaning instruments. It thoroughly cleans every part of the instrument, including the depths of the cannula, tubes and other unreachable parts, with high frequency sound waves generating bubbles and vacuum zones.
- However, ultrasonic cleaners are not essential. One can use four bowl technique for the cleaning of the instruments described below.
- Instrument should be thoroughly cleaned by washing in sterile distilled water or mineral water.
- The tank of the cleaner should be filled above the top of the instruments, suitable detergent as specified by the manufacturer is added.
- The temperature of water should be 80 to 110 degrees Fahrenheit for effectiveness of detergent.
- Enzyme solution or detergent can be added for effective cleaning in the ultrasonic cleaner.
- They should be kept in ultrasonic cleaner for at least 30 minutes.
- After removing the instruments from ultrasonic cleaner, the instruments are first brushed with a soft tooth brush.
- Then washed in four basins containing mineral water or boiled water one after the other the first one contains mineral water with disinfectant. This should be done even if ultrasonic cleaner is not used.

Four Bowl Instruments Cleaning Technique

Drying the Instruments at end of OT session

- They are then dried with clean towel; tipped with plastic sleeve and are segregated into separate sets. They are then packed in individual perforated stainless steel trays, which are placed in the bins with indicator and put in the autoclave. (Three indicator tapes should be placed, one in the bottom, one in the middle and one at the top of the bin), of course one strip on the external surface of the bin is required to tell us whether the bin is sterile or not, even without opening the lid.
- Cannulated instruments are first to be flushed with distilled water three times and then with air three times before autoclaving.

N.B.: Chrome plated instruments should not be cleaned in an ultrasonic cleaner.

(ii) Storage : The instruments should be dried completely before assembling storing. Each instruments has to be checked with the microscope or + 20D lens or loop for its working condition regularly. We can use hot air ovens at 50 degree centigrade for 20 minutes for total drying. However, a hair drier or drying under fan is also good enough. We must make sure that the instruments are totally dry otherwise, droplets of water can contain micro organisms and it is difficult to sterilize the droplets inside the lumen of the cannulated instruments.

(iii) Instrument sets : Instruments should be placed in a tray with perforated bottom to allow steam penetration around the instruments during autoclaving and to prevent air trapping in the tray. Each delicate instrument should be physically separated from adjacent one to prevent damage, interlocking and crushing. The size of the instrument pack should not exceed 20" by 20" and weigh not over 5 kgs.

(iv) Packaging, loading and labeling of instruments for sterilization:

1. Instruments should be arranged in trays to prevent damage. Heavy instruments should be kept in the bottom tray. All detachable parts must be disassembled, syringes separated, caps, plugs removed, etc.
2. Lubricated instruments should be thoroughly cleaned as steam or gas cannot penetrate. This would lead to improper sterilization.
3. The lumens of cannulas must be flushed thoroughly with water before being sterilized. Debris inside the lumen prevents steam penetration and will cause permanent blockage.

4. Rubber sheets should not be folded or kinked, as steam cannot penetrate or displace the air from the fold or kink. The rubber sheet should be wrapped in linen. Rubber items should not be kept with metal instruments to prevent damage to the rubber items. Rubber items should be powdered before autoclaving, otherwise the heat will make the rubber stick and disintegrate.
5. Perforated metal drums are used for sterilizing large items such as theatre drapes. Smaller items can be wrapped in paper bags or material and heat sealed after applying the indicator tape. All the items not in drums should be double wrapped in a cloth or paper bag.
6. The articles should not be packed too tightly. Space for the steam penetration and completion of drying cycle should be present.
7. All the items are loaded in such a way, that every surface is exposed to the steam. All the instruments should face the same side to avoid air pockets.
8. Autoclave tape should be put onto all packs indicating the date of sterilization, who packed them and their contents.

(v) Disinfection and Sterilization: The effective use of disinfectants in the OT is critical for the prevention of post operative infections. The choice of agents and the procedure to be used in OT depends on a variety of factors, such as, degree of microbial killing required, nature of the item or surface to be treated and the cost and ease of using the available agents.

Disinfection:

Disinfection is reducing the number of viable micro organisms, but not inactivating all viruses and bacterial spores.

The most important factor in using disinfectant is its concentration, time of contact with the disinfectant and precautions advised by the manufacturer. Several methods of disinfection are available, but standardization and uniformity throughout a hospital is essential. Disinfection is not a substitute for sterilization. The common disinfectants used in ophthalmology are:

1. Glutaraldehyde 2%
2. Chlorhexidine
3. Iodine
4. Alcohol

High level disinfection:

Ethylene oxide and Glutaraldehyde (at a specific length of exposure time) can be called high level Disinfectants / chemical sterilants. Certain chemicals display some degree of sporicidal action and can overlap in the spectrum of high level disinfectants though in reality they limit themselves to the intermediate range predominantly (e.g. povidone iodine).

Intermediate level disinfection:

Intermediate level disinfection is effected by a large group of chemicals, and this is the major group of chemicals that are being used in the hospital setting. These include alcohols (ethyl alcohol and isopropyl alcohol); halogens-chlorine compounds (hypochlorite, bleach) and iodine compounds (iodine and povidone iodine); hydrogen peroxide; chlorhexidine; phenols (Lysol, phenol); aldehydes (formaldehyde, Glutaraldehyde-limited exposure time) etc. Of all these, certain compounds are chosen for use in specific situations depending on various factors including time of action, toxicity, corrosiveness, shelf life etc.

Low level disinfection:

This comprises of benzalkonium chloride (a quaternary ammonium salt), certain soaps etc.

Equipment / Instruments	Method before use	Method after use
Penetrating skin/mucous membrane (critical)	High level disinfection or sterilization	Intermediate level disinfection
Contact with intact mucous membrane without penetration (semi-critical)	High level disinfection.	Intermediate level disinfection
Contact with intact skin, no contact with mucous membrane (non-critical)	Intermediate level or low level disinfection.	Intermediate level or low level disinfection

However, the above explanations are only for developing understanding, we must use only sterilization for surgical instruments and linen etc.

Sterilization :

Sterilization is defined as the complete absence of any viable microorganisms including spores.

The objective of sterilization is to remove or destroy microorganisms, since they cause contamination, infection and decay. The purpose for sterilization, the material to be sterilized and the nature of the micro organisms that are to be removed or destroyed determines the methods of sterilization employed. Any sterilization process must be monitored by mechanical, chemical and biological method. It includes pressure, temperature and other methods depending on the sterilization method. The sterilization procedure chosen should be appropriate for the item to be sterilized.

The diagram given at the beginning of this chapter explains the gradation of organism type according to the order of susceptibility to disinfectants. Any process that will destroy the whole range of organisms is termed as sterilization. Sterilization can be through physical and chemical means. Physical means include heat and radiation. Chemical sterilizing agents are relatively expensive and are used in specific situations.

Heat can be employed as dry heat (Hot air oven, flaming, infra red rays) which oxidizes and denatures proteins and as moist heat (autoclave) which coagulates and denatures proteins. It is to be noted that boiling is not a mode of sterilization but only a mode of disinfection.

Sterilization by heat:

This is by far the most popular method because of its simplicity, reliability, and is environment friendly in addition to being inexpensive. Autoclaves, hot air ovens and infra red sterilizers are used.

Autoclave:

Autoclaves function under the principle of steam under pressure in order to raise the temperature of steam. This is very effective because of the emission of the latent heat of vaporization from the steam. Various models are in use ranging from gravity displacement models to completely auto cycled high pressure vacuum models. Various models may vary in their specifications.

Two types of autoclaves:

1. Pre-vacuum autoclave- this is used mainly for syringes and other glassware and has a holding time of 4 minutes at 132 degrees C.
2. Gravity displacement autoclave -this requires a holding time of 30 minutes at 121degrees C.

Almost any article which is heat stable can be sterilized using the autoclave. Powders, creams, oils and all glass articles cannot be sterilized using this method.

More costly machines are available in the market which have graphical record facility also. Recently, plasma sterilizers have become available in the market which are very accurate and safe BUT are very costly at present.

Hot air oven:

Dry heat employed in this method is not as effective as moist heat. Hot air is provided by an electric heating element and is circulated using fans (convection currents) inside the oven. The specific advantage of this is the ability to sterilize powders, oils, creams and all glass articles. General specifications include cycles of 1 hour at a temperature of 160 degrees C. Small models of hot air ovens can be used in separate patient care areas and requires minimal skill to use.

Chemical sterilizing agents:

Not to be used in the eye operation theatre at all.

Formalin Chamber

Not to be used in EYE OT at all.

ETO Gas Sterilisation :

Ethylene oxide is a toxic gas and a very effective sterilizing agent. Precautions include scrupulous cleanliness and dryness of the object - otherwise a toxic layer of ethylene glycol forms on the surface. Adequate aeration - at least 72 hours after running the cycle is necessary to allow dissipation of free toxic gas. It can be used for all heat sensitive articles.

Requirements for ETO gas sterilization:

Moisture	20-40% relative humidity
Concentration	540mg/lt-900 mg/lt.
Temperature	50 degrees C
Cycling & aeration time	16 hours

- For cryoprobes, IOL, Eye shield & vitrectomy probes, sutures, cautery etc.
- Clean lubricants applied on instruments. Dry up. Pack instruments in polythene bag in such a way that indicator tape remain inside.

Monitoring of sterilization:

1. All sterile items should come in packs, which are secured firmly with tapes. All packs should have the chemical indicator tape showing adequate sterilization. Users should verify this and report if there is any breach.
2. The autoclave has thermocouples that indicate the temperature inside the autoclave. Pressure gauges measure the pressure of the autoclave chamber.
3. In addition to chemical indicators, microbiological surveillance is done every week. Swabs dipped in B. stearothermophilus spore suspension are kept in the autoclaves to check their efficacy.

Sterilization of Phaco-emulsification Instruments:

Proper cleaning becomes more relevant in phaco emulsification as here we are more dependent on the machine for the surgery.

The IV set is removed from the bottle. The irrigation tubings are disconnected. The irrigation aspiration tube is disconnected from the hand piece. The hand pieces are unplugged from the console. The tubings are flushed with saline solution before switching off the machine and the saline collected in a bin.

Cleaning of the components:

All cleaning procedures must be done immediately after each surgical procedure; otherwise, tissue debris and salts from the saline irrigating solution may collect and cause permanent damage.

Ultrasonic hand piece:

The hand piece is wiped with soft non abrasive linen and distilled or sterile water to remove residual tissue. Both the irrigation and aspiration ports are flushed thrice with 10 cc syringe filled with warm distilled or sterile water. It is repeated thrice with air.

Irrigation and aspiration hand piece:

Clean the hand piece, tip and sleeve with gauze piece dipped in isopropyl alcohol or antiseptic. Thoroughly flush all the hand pieces, components and tips with distilled or sterile water.

Tips and sleeve are usually disposable ones. But they can be re-used if properly sterilized. The tip should be connected to a syringe and flushed with water. Similarly, the sleeve is also flushed with water.

All are then packed into trays for steam sterilization. Care should be taken to wrap the tubing and hand pieces separately in a cloth i.e. the metal components should not come in contact with the wire.

Drying and storing

1. When the autoclave cycle is completed and the contents are ready to be removed, place them on wire shelves to allow free flow of air around them so that they cool without developing condensation. If shelves are not available, place the items in a cool place, but do not pile them on top of each other. If drums are used, they should be sealed immediately.
2. Once items have cooled they can be wrapped in a polythene bag to prevent dust and external damage. The articles should be used within 48 hours of being sterilized. The sterile packs must be stored above waist level, kept dry, protected from dust, handled only when necessary and used within sterilization date.

Table: Method of choice for different items & parameters for them

Item	Method of Choice
Linen, Heat Resistant Metal Instruments, Cautery Electrodes, Silicone, Sutures	Autoclaving
Glassware	Hot Air Oven
Heat Labile Metal Instruments, Sharp Instru.	Hot Air Oven /ETO
Plastic Items, IOL	ETO

	Particulars	Pressure	Temperature	Time
(a)	Blunt instruments, dressing, glass, silicon material, linen vessels	15 PSI	121^0c	30 Mins.
(b)	Rubber items	15 PSI	121c	20 Mins.
(c)	Liquid / solution N. B. Does not require vacuuming	15 PSI	110c	20 Mins

- Instruments should be kept in perforated tray so that steam cleans instruments while autoclaving.
- Arrange instruments in a manner to facilitate air circulation. Tight packing of the bin should be avoided.
- Spread towel in the drum & put tray over it.

Table: Shelf life of sterilized items

Packing material	Shelf life duration
Cloth or paper item in only one paper	3 days
Cloth or paper item in 2 wrappers	28 days
Peel pouch sealed with tape	28 days
Peel pouch sealed with heat	12 months
Cans or canisters	28 days

The quality of the cleaning methods followed and the level of confidence in the OT personnel to carry out set policies would determine whether the acquired goals for a clean and aseptic OT can be accomplished.

4. OT Environment Preparation

(i) Cleaning & Disinfection of OT :

Theatre Cleaning is scheduled as Daily, Weekly & Monthly Cleaning

Daily Cleaning: After Surgery:

1. Equipments such as electrical surgical units should be checked & cleaned first.
2. The floor is wet mopped.
3. Walls are cleaned.
4. Cabinets & doors are cleaned, especially around handles or push plates where contamination is more likely.
5. Walls around the scrub sink need special attention.
6. Transportation carts and their wheels are cleaned with special attention after use; equipment is disassembled, cleaned and covered properly.
7. Operating Microscopes, Lenses cleaned and covered properly.
8. Operating table covers are changed and patient head support also be cleaned.
9. Trolleys, Revolving stools, Operating table, Foot stool, I. V. Stand are cleaned with antiseptic solution.
10. The floor is always mopped last. A clean mop is used to clean the floor. One bucket is filled with warm water and another bucked with antiseptic lotion (for e.g. : Dettol 1:40 dilution in water)
11. The mop first dipped in the dettol solution, wrung and mop the floor, then dip in the warm water to wash it**. (two bucket technique)**
12. Again dip in the dettol solution, wring out and continue the mop in the same manner.

Weekly Cleaning:

1. All the articles removed from shelves and remove the equipments, furniture from the theatre.
2. Fans and Air conditioners (A.C. Filter) are cleaned, remove the filter from the A.C. Clean it properly with detergent solution and dry under sunlight before replacing.
3. Clean the ceiling and wall mounted fixtures.
4. Regular cleaning of all types of sterilizers as recommended by the manufactures.
5. Washing of walls and floor of the OT with detergent and mopping with antiseptic solution (The dilution of the antiseptic according to the manufactures' advice).
6. Bowls and buckets using inside the Theatre cleaned properly.
7. When cleaning the theatre operation room first then the scrub area, sterilizing area and preoperative patient waiting area.

Cleaning of OT Walls with Sodium Hypochlorite

Monthly Cleaning:

1. Remove all the equipments from the theatre.
2. Scrubbing the floor of the OT to make sure that all accumulated deposits are cleaned thoroughly.
3. Washing all the furnitures and walls of the O.T. Cupboards are removed and areas behind the cupboards are cleaned.
4. Trolleys, Stools, Microscopes are cleaned and oiled where necessary, and then routine cleaning procedures are done as described above.

(II) OT Environment:

Fumigation:

- Aerosol machine/Fogger is used for fumigation (electrically operated) as it can make micro particles. Equal amount of Formalin and distilled water is added depending upon the size of the Theater. After Fumigation, close the theatre for minimum 24 hours. Hydrogen peroxide 1% solution or gluteraldehyde+ formaldehyde combination can be used as a change fortnightly to prevent resistance developing against one agent.
- Fumigation needs to be done once in a week.
- Sterile quality of air in the OT is better achieved and maintained by employing air cleaner and ultraviolet lights and through improving the overall cleanliness in and around the OT.
- Air cleaners are turned on while the surgical session is going on. While the ultraviolet lights are turned on over night after the surgical session when the last person leaves the OT. “Off when the first person enter before the OT next morning". This will continuously clean the inside air while we are working.
- Humidity of the operation theatre can be maintained by employing De-humidifier.

Indications

1. If septic case has been operated, fumigation is mandatory after the procedure.
2. If any new construction or reconstruction of any theatre is done, fumigation is mandatory before the functioning of the same.
3. When routine surveillance reveals any pathogenic spore former, fumigation is mandatory.

Details *of* fumigation *of* theatre

1. 1000 c.ft. room space
   Material needed: a} Formalin - 500 ml
2. Seal the room air tight. Use adhesive to close gaps
3. Add *500* ml. formalin to water 1 litre (Total 1.5 litres).
4. Pour total amount into the Fogger/Aerosol and switch on. Timings can be set with timer. Fogger is the best as the droplet size generated is smaller which can be spread all around effectively.
5. Leave it for 24 hours.
6. Open the room wearing a mask. Put small amount of liquid ammonia solution inside the room for half an hour and also turn the exhaust fan of air conditioner on.

Fogger Machine in use

Table. Regimen for cleaning disinfection and sterilization of the OT

Procedures and Agents	Routine	Efficacy
Mopping of OT floor, walls, tables, trolleys with 1% Sodium Hypochlorite	Every day	Reasonably effective against wide range of gram +ve and gram -ve bacteria but little activity against endospores, viruses and hepatitis virus.
Washing of OT walls floor, tables, trolleys, AC Filter etc with detergent.	Once a week	Enhances the effect of daily cleaning and disinfection.
Fumigation of the operating room with formaldehyde (Occasionally other agents should be used to avoid developing resistance)	Weekly or after surgery on the infected cases	Efficacy uncertain in temperature below 20^0 C and relative humidity below 70%
Washing of OT after removing all its contents	Monthly	Enhances and improves the effect of cleaning and disinfection.
Maintenance, repair of any breaches, cleaning of the ventilation system.	Once in a six month period	Enhances and improves the effect of cleaning and disinfection.

C. Intra Operative Activities

1. Patient Preparation

Asepsis does not stop with the care taken by the doctors and paramedics. It is also necessary to include the patient. The patient is the most susceptible of all to infections. And for an ophthalmic surgery the complications may translate to blindness. Many a times, post operative complications are due to the flora present on the patients' skin. Proper cleaning of the site to be operated upon would prevent them.

Patient attire and cleaning of the area of the eye to be operated

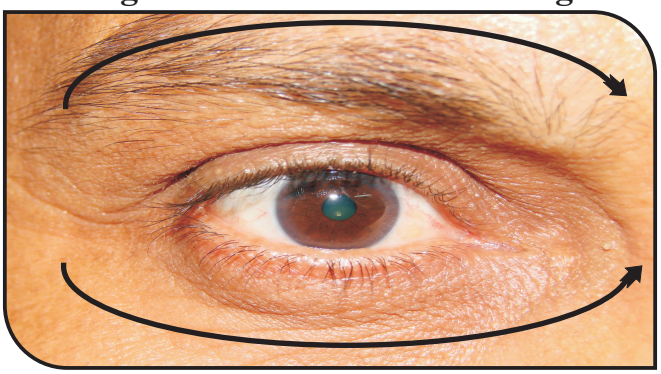
Prior to entering the OT, the patient is asked to wash the face thoroughly, especially around the eyelashes, with water and soap. This should be done under the guidance of a paramedic, if required. Inside the OT complex the patient is taken to the pre op room and asked to change into OT dress. Ideally, the patient should be asked to wear clean theatre clothing. Shoe covers and caps are given to the patients to be worn.

All the records are cross checked and the eye to be operated upon is indicated with a band on the wrist or marked on the forehead with marker pen or sticking plaster applied on the forehead and on the case paper.

The area around the eye is then painted with povidone iodine (10%). The strokes should be from the lateral canthus to the medial canthus of the eye. Following anesthesia, povidone iodine (5%) eye drops are instilled in the conjunctival sac which is allowed to act for two minutes before washing.

Technique of usage:

Figure: 4 Direction of Painting



Povidone iodine asepsis is the most important prophylactic measure to be followed to bring down the number of organisms present in the eyelids and conjunctiva. The bottle containing povidone iodine should be tightly capped. Fresh solution is to be prepared daily. The shelf life is about one month.

Povidone Iodine is a BROAD SPECTRUM and strong antiseptic. It will kill all bacteria within a minute (spores more slowly). Painted Skin will not get reinfected for another 1 hour.

The patient is now ready for Anesthesia (Peri Bulbar Block).

2. At the Time of Block

- The table/trolley should be thoroughly cleaned everyday with wet towel and dried. Then it should be cleaned with disinfectant solution. An autoclaved sterile towel should be placed over the table before placing the required anesthetic solution, syringes, needles etc. Un-sterile items should not be put together with sterile items.
- Hygienic hand wash before each block should be done and sterilium should be applied on hand before giving the block.
- Wearing gloves after hand wash protects us from getting into problems. BUT for aseptic purpose, we must not touch anywhere after hand wash and wearing gloves. If we do not want to use gloves, at least a hygienic hand wash before giving block is required and person should not touch anywhere else after the hand wash before giving the block.
- All the cotton and linen used in the block area should be pre sterilized and strips to be applied over them.
- Pulse Oxymeter can be used to monitor the patient while giving the block. More so if the anaesthetist is not present.
- Only required medicines to be taken out on a day-to-day basis from the store.
- An emergency tray should be kept ready.
- Like needles, syringes also need to be changed for every patient.
- They should do cross check of pre-operative work up (confirm the case, eye to be operated) before giving block.
- Following anesthesia, povidone iodine (5%) eye drops are instilled in the conjunctival sac.

3. On the Table

- The area around the eye to be operated is then painted with cotton soaked in povidone iodine (10%) on a swab holder. As mentioned earlier, the strokes should be from the lateral canthus to the medial canthus of the eye & go on to surrounding area i.e. eye brow margin to upper cheek including nasal bridge which should be allowed to stay for 2 minutes.
- It is good if we use a small size plastic drape which can cover the eye lid margin and the lashes in addition to the sterile towel (linen). If this practice is used, one can give up cutting eye lashes. However, use of full size plastic drape (equal to the size of regular drape) is a much better option if it can be afforded cost wise.

- The ideal is to use only big size Plastic Disposable Drape and not use Linen drape as being porous material it can transmit the Bacteria more so when it is wet.
- Dilute 5% Betadine eye drop should be instilled in the eye and allowed to act for 2 minutes before washing.

4. Etiquettes inside the Operation Theatre

While observing surgery:

- One should keep one's hands behind one's back thereby decreasing the temptation to reach out and contaminating the sterile supplies or area
- One should never touch or pass hand over the sterile field.
- One should maintain at least a one-foot clearance from the sterile field.
- One should avoid passing between two sterile fields.
- One should not lean over the sterile field and hence do not allow any of his/her clothing to touch the sterile field.
- Excessive sneezing and coughing should be avoided.
- Observers should not stand behind the surgeon but should stand away.

While circulating for surgery:

- A sterile packet is not to be used if the sterility is doubtful. Check the package for holes or breaches.
- Always check expiry date before opening the pack.
- Always open a sterile pack away from yourself keeping your finger on the outside of the wrapper.
- When pouring sterile water, hold the container approximately 6 inches from above the container.
- Do not pass the item over the sterile field.
- Do not pierce instruments on towel.

While scrubbed for the surgery:

- When donning gown and gloves it is to be ensured that bare hands touch only inside of the gown and gloves.
- The back of the gown and from the waist below is not considered sterile hence one has to remain facing the sterile area. The area around neck is also considered unsterile.
- When changing places with another scrubbed person, one has to do so back to back.
- The sterile instruments should be kept above the waist level.

- Gloved hands are to be kept above the waist level and below the chin level. Also one has to keep them on the topside of the sterile field. If the hands are idle, one has to clasp them together in the front or on the sterile trolley. Don't fold hands under armpits.
- When a cough or sneeze in inevitable, step back from the sterile field and one should turn his/ her head away.
- Surgeon should not touch unsterile portion of microscope.
- Put sharp instruments keeping edge upward on clean towel.

General:

- Swab should be taken for culture once a month from operation tables, surgeons' hands and sisters' hands. Nails should be trimmed regularly.
- Surgeon's dress should be washed with detergent. Cap & mask should be autoclaved.
- Apron, bed sheet & OT Slippers should be washed with detergent daily and dried.
- Keep slippers for OT & toilet strictly separate.
- Theater boys should be instructed to change dress & slippers before leaving theater.
- Stretcher & wheel chair for inside OT & outside OT should be separate.

5. Trolley Preparation

- If possible, everything for one surgery should be sterilized in one separate medium sized drum. That will mean there will be equal number of sterilized medium sized drums as the no. of surgeries for the day. (This is the highest ideal)
- It is good if trolley is cleaned with spirit & not burnt. Cleaning should be done using unidirectional strokes.
- Practice of preparing the main trolley is avoided. So that the chance of spreading infection from the common trolley is eliminated. Anything wrong with the main trolley will get transmitted to all the cases operated in that session.
- Each time, fresh trolley should be prepared (Remove everything from the trolley at the end of the surgery and prepare it afresh for the next surgery).
- One sterile towel be placed first and then a sterile polythene plastic sheet is placed over each trolley.
- Two cups - one containing RL to clean the powder off the gloves and one with 10% Betadine should be used on the trolley which should be changed every time.
- After the surgery the scrub nurse hands over the used instruments to the sterilization room nurse for cleaning and re-sterilization.
- Trolley drape should be changed after each surgery.
- The trolleys must not touch anywhere.

6. Laying Instruments on the Table

- Each trolley should be covered with double drape.
- A separate folded towel to be used for sharp instruments.
- Dressing material (pad, stick, and shield) to be placed beside the cups.
- RL bottle should be placed in the center of the table if used at all.
- Instruments must be placed over it with tips facing up.
- Used instruments should be segregated from sterile instruments.

7. Intra Ocular Fluids and other items

- The irrigating solutions are one potential source for infection or sterile uveitis. It is essential to buy from reputed companies as well as monitor their quality. Following are some of the guidelines to monitor quality of these solutions.
- IV set and Inj. RL should be used fresh for each surgery if we can afford the cost or else, it should be autoclaved for each surgery separately & for that **glass bottle** should be purchased.Similarly Visco elastics must also be autoclaved before using in the surgery (knowing that some visco elasticity may loss) even though those are provided pre-sterile.
- A quality check of the local company's product can be done, that can help us get an evidence of the quality of the drug that we are using.
- On purchase, one must check it before even stocking, for any suspended particles against a bright light. The bottle again should be checked by the nurse before autoclaving.
- RL with IV line should be stopped for giving cortical wash preferably. Instead use silicon bulbs.
- Before autoclaving, the outer surface of the bottle should be cleaned, washed and the aluminum cap should be removed (not the seal) before packing it in a bin for autoclaving.
- The bottle should be cooled well before using. Hence it is advisable to autoclave the bin containing the bottles first but they should not be removed from the drum.
- For autoclaving fluids, there is no need for vacuuming and the recommended cycle time can be only 30 minutes. The temperature and the pressure are the same as for linen or instruments.
- Prior to use in surgery the contents of the bottle should be again checked for any suspended particle.
- RL should be autoclaved in a drum, not put in the autoclave machine directly.
- All old stocks of IV fluids are to be used before a new batch is used.
- The expiry date should be checked before connecting the bottle for use.
- Do not reuse bottles that have been used previously. Discard after single use, even if some fluid remains in the container.
- Do not puncture bottles with needles to create airways.

- The bottle must be carefully checked for damage and for leaks before use.
- If there are visible contaminants in the bottle, do not use the IV fluid. Send the bottle to the microbiology department for culture, inform the pharmacy so that the particular batch of IV fluids can be withdrawn and inform the Hospital Infection Control Officer.

Handling sterile syringes and needles:

- The sterile syringe pack is unrolled taking care to touch only the end of the plunger first. The plunger is inserted into the barrel and the assembled syringe is then taken out of its sterile cover. The tube containing the sterile needle is held horizontally and the cotton plug is removed. Then the hub of the assembled syringe is placed at the mouth of tube. The needle is manipulated into the hub through the tube and then tightened by holding the needle only. The plastic needle guard is then removed.
- The vial's metal top is removed and the rubber cork is cleaned with a spirit swab before injecting / withdrawing fluid with a needle. The used needle for withdrawing medicine, usually 20 G needle, is then changed before injecting a patient. Never use the same syringe again once unsterile, until it has been sterilized in CSSD.
- While loading & administering the medicine, do not handle / touch the body of the plunger.
- After administering the medicine, do not recap the needle to avoid needle stick injury. Remove the needle by holding the hub only and drop the disposable needle directly into the sharps container.
- Flush the used reusable syringe with disinfectant solution. Discard the syringe without flushing, if disposable.
- Syringes & needles for reuse are placed in separate containers with soap and water solution or disinfectant. Rinse the syringe in the same solution, remove the plunger from the barrel and then place them in the container.
- Use gloves while sorting syringes and needles. Handle with extreme care to avoid accidental injury. Before sending the unsterile syringes and needles to CSSD, the soap solution is drained directly into the sink and the needles and syringes are dropped separately on a towel. The reusable needles are arranged holding the hub only.
- Solutions used for injections can be left open for a maximum of one day only.
- It is the responsibility of the person using a multiple dose solution to determine its safety for future use based on any perceived compromise to the solution's sterility. If breaks in technique have occurred, the solution must be discarded.
- Do not use the same needle to load the solution for different injections. A fresh needle must be used for loading the solution and another fresh needle should be used for injecting the solution every time.
- After loading the solution for one injection, remove the needle from the vial and discard it in the sharps container.

8. Scrubbing Technique

Hand washing:

- Hand washing is one of the most effective methods of prevention of spread of infections.
- A liquid soap or an antiseptic should be used to cleanse the hands.
- Only scrubbing will be discussed. Other methods are described elsewhere.

Hand scrubbing:

Effective scrubbing is mandatory to protect the patient and the medical team from infection before and after performing surgery. The purpose of the surgical hand scrub is to reduce resident and transient skin flora (bacteria) to a minimum. Because these bacteria are firmly attached to the skin, they are difficult to remove. However, their growth is inhibited by the antiseptic action of the scrub detergent used. Transient bacteria are usually acquired by direct contact and are loosely attached to the skin. The bacteria are easily removed by the friction created by the scrubbing procedure. Proper hand scrubbing and the wearing of sterile gloves and a sterile gown provide patient with the best possible barrier against pathogenic bacteria in the environment and against bacteria from the surgical team. It is followed prior to any surgical intervention.

Figure:

Automatic Soap Dispenser

Aquaguards in the Scrub Area

Step 1: (3 minutes)

- Prior to hand washing, all the jewellery on the hand and wrist watches should be removed. The nails should be short and should not be painted.
- The hands must be first washed with tap water and liquid soap. The tap should be turned on using the elbow or an unsterile person should do it. The tap should preferably be an elbow operated one or should have a foot peddle. Liquid soap is preferred over bar soap as the latter is a potential source for harboring micro organisms. Lather is worked up to 3 cm above elbow for about one minute. The soap is then rinsed off. This procedure should be repeated for two times. The flow of water should always be from fingertips to the elbow. Repeated three times.

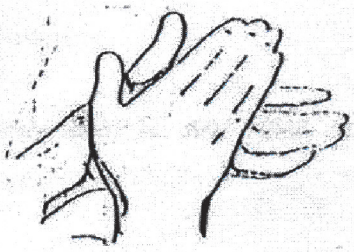
Step 2: (4 minutes)

- The next step is scrubbing of the hand with a hand scrub like povidone iodine or chlorhexidine. Scrub each hand with the other. Scrub in a circular motion all surface, starting from nails, forearm and up to approximately 3 cms above the elbow. A special attention should be paid to web space, nails and sub-ungal area.
- Hands are rinsed thoroughly under running filtered water after scrubbing. If filtered water not available, boiled and cooled water can be used. In such a case, the nurse pours water from a jug. The direction of water flow must be from fingertips to elbow. The hands are held up and elbows below.
- Repeated twice.

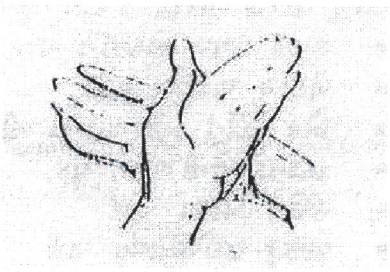
Step 3:

- After rinsing, the hands should be kept away from the body, with hands above and elbow below away from the body.
- The tap should be closed with the elbow or a nurse turns it off.
- The hands should be dried with a sterile towel. Begin with the hand, wrists and then forearms. The same section of the towel should not be reused. If required, a second towel can be used.
- A minimum of seven minutes of scrubbing is considered the shortest acceptable duration for hand washing prior to surgery.

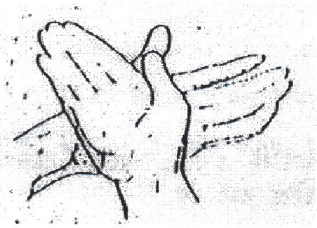
- Keep hands above the level of elbow through out scrubbing
- Avoid to and fro movements to prevent contaminating clean area
- Avoid splashing of water while scrubbing
- Repeat the whole process if hand touches anywhere while



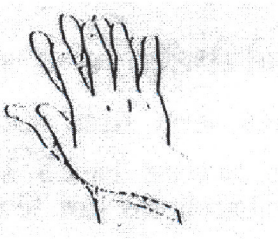
Palm to Palm



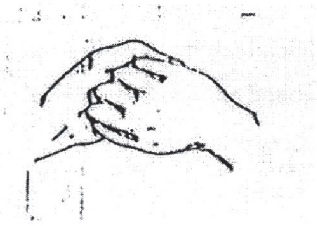
Right Palm over Left Dorsum



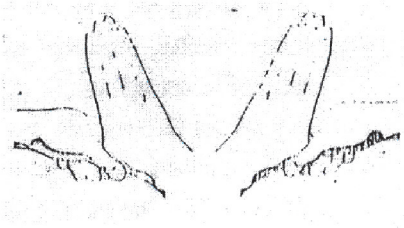
Left Palm over Right Dorsum



Palm to Palm with Fingers Interlaced



Back of Fingers into the Opposite Palm with Fingers Interlocked



Rotational Rubbing of Thumb with the Opposite Hand

Rotational Rubbing on the Tips of Fingers & Thumb of Right Hand in Left Hand and Right Palm then Opposite

9. Gowning and Gloving Technique

Gowning:

Sterile gowns are always folded inside out to avoid contamination. As it is impossible to render the hands sterile, they must not come in contact with the outside of the gown or gloves.

Procedure:

- Pick up the gown holding it well away from the trolley and your own body.
- Hold the neck band and unroll until the sleeves are seen.
- Slide both hands and arms into the sleeves at the same time.
- The floor nurse/assistant slides her hands under the gown at the shoulder and pulls out and fastens all the back tapes.
- Cover the back with the back flap with the help of the un-scrub nurse.

Remember:

- Do not keep the hands lower than the waist line.
- Do not keep the hands near ones neck or shoulder.
- Do not touch the axillary area once gowned.
- Do not touch the back of the gown.

Removal of Gown at the end of the Procedure:

- The circulating nurse will unfasten the gown.
- The gown is carefully removed by the scrub nurse leaving the gloves on.
- The gown with the inside folded out is placed in the appropriate bin.
- The gloves are then removed by holding the inside of the cuff and placed in appropriate container.

Gloving:

- Pairs of sterile gloves are packed in such a way as to facilitate handling without touching the outside of the gloves with bare hands.
- A 2" cuff is folded on each glove.
- There are two methods of gloving, **The open method & the closed method.**

Procedure for wearing gloves

'Open' Method:

- **Always take chlorhexidine or its equivalent solution on bare hands before Gloving.**
- Pick up the first glove by gripping its cuff with one hand and slip the other hand in.
- With the gloved hand, pick up second glove by slipping hand under the cuff (outside of the glove) and slip the ungloved hand in and release the grip.
- At this stage adjust the fingers of the gloves properly.

- If gowned, the cuff of the second glove is pulled over the stockinet sleeve of the gown.
- The cuff of other glove is then pulled over the stockinet sleeve.

Closed' Method:

- The hands are not pushed beyond the stockinet cuffs of the gown.
- The cuff of the left hand glove is grasped through the stockinet part of the right sleeve.
- The left hand is inserted into the glove and the glove grasped by the right hand is pulled over the left hand.
- After stretching the cuff, the glove is pulled over the sleeve, and the hand is forced through the stockinet cuff into the glove.
- The second glove is put on in a similar manner except that the cuff can be grasped with the already gloved hand and the right hand is forced through the stockinet cuff into the glove.
- **Glove powder can cause irritation and induce postoperative complication (Sterile Uveitis). Hence, it should be wiped off with a sterile wet mop.**
- **Take chlorhexidine or its equivalent solution on gloved hands to form a layer and allow it to dry before starting the surgeries.**

Removal* of *Gloves (for both types* of *gloves):

- To prevent outer surface of gloves from contaminating hands, the gloved fingers of one hand grip the outer surface of the cuff and pull off inside out.
- To prevent contamination of the ungloved hand, the inside of the cuff of the opposite glove is held and pulled off the hand.
- Gloves are discarded into the designated container.

10. Activities Between two Surgeries

- After the surgery the scrub nurse hands over the used instruments to the sterilization room nurse for cleaning and re-sterilization.
- RL, Visco elastics and SICS blades should not be passed on to next patients.Visco elastics should be discarded. Ringer Lactate should be either discarded if we can afford cost wise or else can be autoclaved once.
- SICS Blades must also be changed after each surgery which can be autoclaved.
- Ideally one must re-scrub between the two surgeries for 3 minutes if we do not touch elsewhere and circulating staff remove the scrubbed person's gown. Else scrubbing for full 7 minutes is recommended. We must have our own protocol.
- Minimum requirement is to change the Gloves after each surgery.
- Each time, fresh trolley should be prepared (Remove everything from the trolley at the end of the surgery and prepare it afresh for the next surgery).
- IV set; Visco elastics and Inj. RL should be used fresh for each surgery.
- For each surgery autoclaved set of instruments must be used.Flash autoclave can

be used to sterilize the instruments in short period of time in between the surgeries if there is less instrument sets than no. of surgeries.

- Microscope Knobs must also be changed which should be autoclaved.
- Ideally Phaco probe and tubings must also be changed after each surgery but we must work our own protocol.

11. Surgeon Factors and Surgical Technique

Surgeon Factors:

- As the large volume of surgical work is done, Ophthalmologists try to finish the numbers in limited time. But the protocol should be followed even if the total time required for performing all the surgeries increases.
- Surgeries per surgeon should not exceed 15 in a day.
- Every hospital has to fix the no. of surgeries in a day according to staff available.
- One can spread the same no. of surgeries equally over the year to reduce the stress of no. of surgeries to be done in a day so that we can manage them in a better way.

Surgical Technique:

- Draping technique: isolate lids and lashes.
- Avoid Pooling of the surface fluids during the surgery by using aspirating speculum or tilting the patient.
- Avoid Complications: Capsular rupture - even if it occurs, do proper vitrectomy and secure the wound properly as vitreous is an excellent culture medium.
- Less surgical time will help in preventing the infection.
- Surgeon should reduce the number of times they enter the AC to a minimum.
- Safer incision: Scleral incision may be safer as they are typically less prone to deformation because of their square surface architecture. Clear corneal incision tends to be more rectangular in their surface architecture because sharp blades are used to create them.
- Hermetic sealing of the incision is the key.
    - Do not distort the tissue.
    - Stromal hydration is desirable.
    - Elevate the IOP to seal the valve.
    - Check the competence.
    - Future role of the Glue.
- Intra cameral antibiotic at the end of the surgery (Cefuroxime 1 mg /0.1 ml or Vancomycin 1 mg/0.1 ml).
- RL with IV line should be stopped for giving cortical wash preferably.Instead use silicon bulb.

(D) Post operative Activities:

Enough time must be given to the operation theatre staff for the end of the day cleaning activities. This will ensure that the operation theatre is ready for the next day in a desirable manner.

1. **Cleaning of Instruments:**
   - The instruments should be cleaned as early as possible following the use. This will help avoid drying of debris or blood on the surface of the instruments.
   - Cover the tips of the instruments immediately at the end of the surgery to avoid spoiling of the tips of sharp instruments.
   - The method of cleaning is described on page no.8.
2. **Cleaning of OT complex:**
   - At the end of each session, all the waste must be disposed off as per the waste disposal guidelines in colour coded bags. Over the last decade, the disposal of operating room and hospital waste has received much attention. Incineration has been advocated as a viable method of hospital waste disposal. Recently attention has been directed at preventing air pollution from incineration and to find alternative medical waste treatment technologies. These options include gasification, steam sterilization or heat disinfection of certain wastes prior to disposal in landfill.
   - All the extra items must be removed from the operation theatre.
   - The floor is cleaned with 1% sodium hypochlorite solution using a two bucket technique thoroughly.
   - The walls are cleaned with 1% sodium hypochlorite solution up to six ft. height daily.
   - Bed sheets and linen is removed from the operation theatre and sent for washing.
3. **Cleaning of equipments:**
   - All the equipments including OT tables, stools, microscopes, fans, light, watches etc. should be cleaned with 1% sodium hypochlorite solution daily at the end of the day.

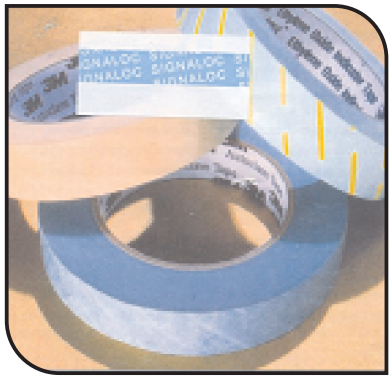
- Slippers should be washed with detergent and dried completely.
- The washing of slippers should be done away from the instruments washing area or the scrub area.
- Microscope head should be cleaned with bacillol spray.
- Microscope lenses should be cleaned with lens cleaning solutions.

4. Cleaning of Environment:

- There is no need of daily fumigation; it is enough to do weekly fumigation.
- Ultraviolet lights should be turned on when the last person leaves the operation theatre and kept on until the next morning when the first person enters the operation theatre.

(E) Monitoring

1. **Monitoring Environment:**
   - The environment cleanliness is monitored biologically.
   - Open dish sedimentation method is generally used. A nutrient agar plate is left open in one corner of the operation theatre at the beginning of the activities in the morning. After half an hour, it is taken to the laboratory and incubated. Growth of less then 10 colonies is considered good enough to continue the activities. Otherwise, the cleaning and fumigation need to be repeated and after cross checking biologically only the theatre is used for performing surgeries.
   - Bacterial counters are available but they are very costly and not used commonly.
2. **Monitoring sterilization process:**
   - Mechanical monitoring
     - Log book of autoclaving is maintained where the time, temperature and pressure are entered with the time and duration of the cycle is also recorded.
   - Chemical monitoring
     - Chemical indicator tapes are used. The change of colour at the end of the cycle indicates attainment of the desired temperature during the cycle. The colour of the strip at the end of the cycle should be jet black otherwise the cycle should be repeated.
     - Once a week or if afforded cost wise, a Bowie Dick test pack can also be used.
     - A vapour line indicator can also be employed. The frequency depends on the amount of autoclaving done.



Chemical Indicator Strips

Bowie Dick Test Pack & Vapor Line Indicator

Biological Indicator Ampoules

- Biological monitoring
  - Biological indicator ampoules are available for steam sterilizers and for hot air ovens both.
  - They employ bacillus stearothermophillus spores.
  - The ampoule is to be put in the load along with other items.
  - At the end of the cycle, the ampoule is removed and opened.
  - The test tube inside is broken and the material is incubated.
  - At the end of 72 hours if there is no growth of organisms, then it is conclusive proof that the cycle was run properly and the load was completely sterilized.
  - Generally done once in a week.
  - The autoclaving person should not be aware of the use of biological indicator in that particular cycle. It is supposed to be a surprise check.

3. Monitoring sterility:

- The autoclave strips should be checked by the theatre in charge and the operating surgeon both.
- Strips from each drum should be properly labeled with date and name of the item etc.
- The colour of the strip must be jet black.
- Strips should be pasted in a register and the register be signed by the in charge and the surgeon both.
- Regular use of alternative methods of cross checking the efficiency of the autoclave cycles should be employed.
- For all the pre sterile items, we must check the mark of sterility and the date of expiry at the time of storage and at the time of usage also.
- All the pre sterile packs must be checked for the integrity of the packs. Any holes or breaches in the packing should be checked and if found, the item should be rejected.
- Weekly samples should be taken from sterile items and scrubbed personnel at the end of the surgery and should be sent for biological testing.

- Weekly samples should be taken from the air conditioner filter, operating table, trolleys, microscopes, and scrub area, area where the drums are stored or kept while using them.
- Nasal and nail bed swabs also should be taken at regular intervals and sent for testing.

4. Monitoring of hygiene:

- All the staff members working in the theatre must under go a regular health check up. Nails should be regularly checked and trimmed.
- Any skin infection should be treated immediately and the person with skin lesion should not be allowed to work inside the operating room.
- Nasal carrier state must be checked and all the staff members in carrier state must be treated.

5. Monitoring of activities:

- All the activities must be monitored carefully using various check lists given in the annexures.

Standardized Sterilization Protocol for Kasturba Hospital, SEW A Rural, Eye Department

The following were standardized by the staff members of Eye Department on sterilization practice.

1. Instruments:

Preparation of Instruments for Sterilization

1. Separate the sharp instruments from the blunt instruments.
2. Instruments should be cleaned as soon as possible after their use, especially simcoe cannula.
3. Instruments should be thoroughly cleaned by washing in distilled water/mineral water. 3M Rapid enzyme will be used for effective cleaning. Alternatively surf powder will be used.
4. After removing the instruments from ultrasonic cleaner, it will be washed in four basins containing mineral water; dried with towel and Hot air Oven; tipped with plastic sleeve on the tip and packed in individual trays.
5. A clean toothbrush should be used to clean the instruments. To be changed every 15 days. (Hard one should be used).
6. Instruments should be placed in a tray with perforated bottom to allow steam penetration around the instruments during autoclaving. Separate medium sized drum for two sets of surgery, all items which are required for two surgeries are kept in this drum. (However, the highest ideal is to autoclave everything required for one surgery in one separate drum).
7. Size of instruments pack should allow space for steam penetration in the drum
8. Place the tray inside a bin after spreading the towel inside.
9. Gloves must be worn while handling the instruments to avoid infective material & cuts.
10. All the instruments should be cleaned with ultrasonic cleaner once a week. Cannulated instruments are cleaned daily. Cycle time should be 30 minutes. To add 3M Rapid Enzyme solution,use mineral water.

Blunt Instruments:

Method of Choice: General Autoclave

Safe method of sterilization, as it kills bacteria, spores, viruses, fungus. Indicator tape should be used in every cycle. **Normally 3 tapes (bottom, middle and top-within the drums) are placed**. One more tape is placed on to external surface of the drum.

	Items	Pressure	Temperature	Time
(a)	Blunt Instruments dressing, glass, silicon materials, and Linen vessels.	20 PSI	121^0C	45 min
(b)	Rubber items	20 PSI	121^0C	45 min
(c)	Liquids	20 PSI	110^0C	30 min

Note: Autoclaved instruments should be used within 48 hours
The water should be drained out fortnightly to avoid settling of salt on the instruments and in the chamber.
Clean the autoclave machine's outer and inner surfaces regularly
Once in 6 months the autoclave should be serviced.

Mode of sterilization during surgery (in between cases):
Autoclaved for 10minutes- high speed autoclave
The instruments are cleaned in clean sterile water or distilled water.
The cleaning water should be changed after cleaning 4 or 5 sets.

Sharp Instruments (Including razor blade):
As for blunt instruments prior to surgery as well as in between cases
E.T.O. can be used as an alternative method for sterilization of sharp instruments.

Special Instruments:
Vitrectomy Cutter, Cautery wire

- Vitrectomy cutter and Cautery wires are autoclaved only.

Alternate method- Ethylene oxide (Gas Sterilization)
Remove all lubricants from instruments
They should be absolutely dry
Pack them in polythene bag with indicator tape inside the bag.

2. Sutures

- Should be reused after autoclaving only.

3. Linen

- All dresses washed with detergents
- Caps and masks are autoclaved
- Aprons and drape sheets to be washed with detergent, dried and autoclaved in a loosely packed, separate drum with an indicator strip pasted.

Note: No one should be allowed to enter the theatre with street clothes.

4. Irrigation Solutions:

- Check clarity of solution.
- Look for suspended particles.
- Check for leakage and quantity of solution.

5. Viscoelastic:

- Viscoelastics are autoclaved before surgery.
- The left over is neither re-autoclaved nor reused in the operating rooms.

6. Scrubbing:

Principle: To scrub from a clean area (hand) to less clean area (arm).

Methods:

- Hand to be first washed with ordinary tap water + medicated liquid soap for three times, one minute each, followed by scrubbing with chemical disinfectant. To use purified water for hand wash and not tap water. Scrub up to 3 cms above elbow.
- Chemical disinfectants (Povidone iodine liquid scrub or 20% Chlorhexidine) to be used twice on each occasion for 2 min (Rub but avoid using brush).
- The staff & surgeons are all required to use surgical gloves, which after being worn are cleaned by using sterile autoclaved water or cotton balls soaked in sterile water prior to the procedure to remove glove powder.
- To re-scrub after every 2 surgeries for 3 minutes if we do not touch else where and circulating staff remove the scrubbed person's gown. (However, the highest ideal is to rescrub after each surgery).

During Surgery

- Should see that observers keep a distance; do not allow them to stand behind you.
- Should keep sharp instrument on towel such that tip is facing up.
- Do not poke the instruments on to the towel.
- Big size Plastic disposable drapes will be used. Plan is to stop using linen drapes as it is porous material which can transmit the organism more so if it becomes wet.
- Do not touch sutures/IOL, any instruments to lid margins.
- Wait for two minutes after applying Betadine for drying before applying drape.
- End of surgery put 5 % Betadine drop.

Between cases:

- Apply2.5% Chlorhexidine hand rubs.
- Change the gloves after each case or when it comes in contact with unsterile surface.

7. Theatre Sterilization:

Operating room & Corridors:

- Daily OT floor is swept thoroughly and then mopped with tap water containing 1% sodium hypochlorite.
- After washing, formalin fumigation is done once a week and theatre is closed for 24 hours. After formalin fumigation on Saturday, OT is opened on Monday only. Alternately Glutaraldehyde + formaldehyde combination and 1% Hydrogen peroxide with silver nitrate are used every 15 days. Corridors are fumigated with formalin.
- Sterile quality of air in the OT is better achieved and maintained by employing air cleaner, Air Curtain and ultraviolet lights and through improving the overall cleanliness in and around the OT. Air cleaners are turned on while the surgical session is going on. While the ultraviolet lights are turned on over night after the surgical session when the last person leaves the OT. "Off before the first person enter the OT next morning". This will continuously clean the inside air while we are not working.
- Humidity of the operation theatre is maintained by employing De-humidifier.
- Complete cleaning of the theatre including walls, doors and floors is done daily up to six ft. height with diluted 1 % sodium hypochlorite.
- Block room, changing room, doctor 's room must be cleaned daily three times with 1% sodium hypochlorite.

8. Equipments:

- Fans, light, watches etc. inside theatre are wiped once a week, with diluted 1% sodium hypochlorite.
- Equipment like microscopes should be cleaned separately with 15% Cetrimide and 3% Chlorhexidine gluconate (Instruclean) daily, except lens.
- 0.1%Ehtanol, 0.1%2-Propanoland 0.06%I-Propanelmixture(Bacillol25 spray) is used to clean the head of the microscope daily.
- Lenses should be cleaned once a week with lens cleaning solutions.

9. Furnitures:

- Tables, saline stands, revolving chairs (surgeon seat) should be cleaned daily with sodium hypochlorite or antiseptic liquid concentrate (Chlorhexidine gluconate 75% -10 ml should be diluted with 500 ml of water or 10% Benzalkonium chloride).
- Not to keep Wooden furniture inside the O.T. as it can harbor the organisms.

10. Air conditioning Unit and Water tank:

- Air conditioner filter must be cleaned once in a week.
- Water tank should be cleaned with Bleaching powder once a month.

11. Microbiological evalution:

- Periodic culture is done once in a month from areas such as hand wash, saline, cannula, distilled water and swabs are taken from Surgeon's hands, Assistant's hands, floors, walls and air conditioner for culture once in 15days.
- The Bacterial carrying particle (BCP) load in theatre is checked by sedimentation plating technique every fortnight.

12. Others:

- Slippers for toilet use and theatre are kept strictly separate.
- Slippers are daily washed with detergent and dried.
- Theatre boys are instructed to change the dress as well as slipper before leaving the theatre.
- Stretchers used in & out of theatre are separated.
- Keep the doors of theatre always closed.
- Garbage should be disposed after each session.

13. Pre operative preparation:

- Patient is allowed inside the block room after taking bath.
- Washed caps, gown and shoes are worn
- The eyebrows and lids are cleaned thoroughly with **10% Povidone Iodine before Block and in wards also.**
- One drop of **Flurbiprofen** (anti inflammatory drops) and **Cyclopentolate** eye drops are instilled.
- After block, one drop of 5% Povidone iodine is instilled.
- On the table prior to surgery, again the eye is cleaned thoroughly with diluted Povidone Iodine and one drop of 5% of Povidone Iodine is instilled and allowed to stay for full 2 minutes.

14. Outpatient department:

- Instrument tray should be autoclaved daily.
- Instruments once used in OPD must be autoclaved.
- Instruments used on infective cases are kept in Cidex for 10 hours prior to being cleaned and is autoclaved twice before use.
- Disposable products should be strictly disposed.
- Slit lamp should be cleaned with spirit after an infective case is seen and routinely every day.
- Floors should be swept thoroughly and then mopped with Phenyl mixed with detergents (disinfectant cleaning solution) at lease3 times a day.
- Eye drops should not be kept uncapped.

15. Wards:

- Floor swabbing to be done daily with phenyl mixed with detergents (disinfectant cleaning solution).
- Instrument trolley should be cleaned everyday. A separate trolley should be kept for dressing infective cases.
- The drops should be kept clean and the tip of the dropper should not be touched.
- The hands should be washed before applying any medication.
- The slit lamp should be cleaned everyday.

16. O.T. Discipline

- Separate entry for both Scrubbed staff and Un-scrubbed staff/patients.
- Scrubbed staff enters towards the head end of the patients.
- More space towards head end.
- Segregation of sterile and un-sterile area.
- Strict restriction of circulating staff/observer in the sterile area.
- Restriction of surgeries up to 30 in a day to give sufficient time to the staff for O.T. preparation for the next day.
- Restriction of surgeries per surgeon to 15 per day.
- Separate septic O.T.away from main O.T.
- O.T. closed on last Saturday of every month for O.T. Washing after removing all the movable items outside the OT.
- Restriction of the surgeries up to 15 on Saturday to give sufficient time for weekly cleaning and O.T. staff meetings.

Check Lists and Reports

Annexures:

These Checklists are just examples. Organisations may design their own Checklists as per their specific Requirements.

(1) O.T. Next Day Planning Report:

Date: ……..

(1) No. of Eye Operations: _____

(2) OT staff in attendance: Note if anybody is on leave or break.

No. of nursing staff: _____

No. of OT Boy: _____

No. of Aayah: _____

(3) In case of OT Boy and Ayah either on leave or break, who will be available from outside against such vacancies?_____

(4) Arrangements in Eye OT - At what time OT will start? _____

Table 1 _____ _____ _____

Table 2 _____ _____ _____

Table 3 _____ _____ _____

(6) Note: _____

_____

(7) Incharge Sister _____ HOD _____

(2) Pre Operative Check List Eye OT:

Name of Patient _____Indoor no. _____

1. Investigation: Hb (if GA to be given) _____Urine Sugar _____
   Other _____
2. Eye examination
   Vision _____ Sac _____ Xylocaine Sensitivity_____
   Tension _____A-Scan _____
3. Obtained written consent? _____Attached GVP consent Form? _____
4. Does the patient suffer from diabetes, BP? _____Medicine given? _____
5. Povidone Iodine drops instilled in the eye _____
6. Eyebrows & Eyelashes painted with Povidone Iodine 10%? _____
7. Eye dilated for operation? _____dilated adequately? _____
8. It is cataract (IOL) surgery _____IOL brought as per A scan _____
9. Did medical officer examine?
10. Examination by Anesthetist & weight
11. Did patient have bath / wash face?

Suggestion of Doctor _____ Date: _____

Signature of ward Nurse _____

Signature of OT Nurse _____

(3) Daily Cleaning Check List Eye O.T.:

Date:

1 Who checked Pre operative check list?
2 Who put 5% povidone iodine eye drop before giving block?
3 Who checked Autoclave strip register?
4 Who filled drum of gowns - gloves? Who checked it?
5 Who checked clarity of Inj. RL?
6 Who did preparation before arrival of surgeon? (Cautery & Microscope in order?)
7 Who did Fumigation? With what? (Formalin, 1% Hydrogen Peroxide, Formaldehyde & Gluteraldehyde combination)
8 Who did cleaning before leaving in evening? (Doors should be cleaned every day)
9 Who checked Operation & emergency medicines stock?
10 Who put on the U.V. light at night? Who put it off in the morning?
11 Was the chlorination of water tank done yesterday? Who did it?
12 Who checked anaethesia trolley?
13 Who replaced Bed sheet of O.T. Table in the evening?
14 Who cleaned Equipments / Instruments (Cautery, Suction machine & O.T. Table) with 1 % Sodium hypochlorite??
15 Notes:

Signature of O.T. in charge: signature of HOD:

(4) Weekly Cleaning Check List Eye O.T.:

Date:

1. List of medicines checked? Who did it? (Daily use + Emergency medicines)
2. Who checked Eye O.T. Check list? (List except medicines)
3. Did in charge prepare the list of O.T. staff posting?
4. Who submitted Auto clave Report? Who checked it?
5. In charge checked the list of Sunday work done?
6. Cleaning done on Saturday by shifting things? (Microscope, O.T. Table)
7. Who did Sodium hypochlorite cleaning of sink?
8. Who cleaned Walls and floor of O.T. with Sodium Hypoclorite?
9. Who fumigated Autoclave room on Saturday after cleaning?
10. Who cleaned A/C Filters?
11. Who cleaned Instruments? (Check blade and change it if necessary)
    (Check two way cannuala)
12. Who checked Staff nail?
13. Who checked Chlorination?
14. Who changed Water in autoclave machine? (Change every fortnight)
15. Who cleaned & autoclaved Bottle of surgical scrub and bottle of liquid soap?
16. Who checked Expiry dates of medicines?
17. Who cleaned the Operating Microscope lenses?

(5) Monthly Cleaning Check List Eye O.T.:

Date:

1. Over book of change of O.T. Boy posting checked?
2. Swab sample culture done on second Saturday?
3. A/C cleaned by Air Blower on last Saturday?
4. Did in-charge check the washing of O.T. on last Saturday?
5. IOL Report prepared
6. CME Lecture delivered and exam conducted for O.T. staff?
7. Who cleaned the water tank? On which day?
8. Who cleaned Drums? Holes checked?
9. Webs outside windows removed?
10. Note:
11. Signature of O.T. Incharge: Signature of varifying person:

(6) Quarterly Check List:

Date:

1. Water tap filters of scrub area changed? Yes / No
2. Stock taking done? Yes/ No
3. Stock statement prepared? Copy sent to store? Yes/ No
4. Acid cleaning of water pump of autoclave machine done? Yes / No
5. Note:
6. O.T. Incharge Signature verified by - Signature

7) Weekly Nail Check List:

Date:

No.	Name of Person	Nail Cut	Nail bed Clean ?	Both OK

Notes:
Prepared by:
Signature of I/C:
Signature of HOD:

(8) Preparation for operation and check list of usages in operation

Date: _____

Particulars	Eye OT
No. of operations done	
Time of start of operation	
Time of end of operation	
How many Doctors attended OT	
No. of nurses + Field Staff	
No. of OT Tables + Assistants	1.
	2.
	3.
No. of OT Boys	
No.of Ayahs	
Note :	

Particulars	**Autoclaved**	**Used**
No. of Gowns		
No. of Sheets		
No. of instruments sets		
No. of RL		
No. of gloves		
Inj. Visco Vial		
Phaco Probe (No)		
Needle (No)		

1 to 5 operation	1 drum for Gown	Total Gown 8	6 to 10 Operation	2 drums for Gown	Total Gowns16
	1 Drum for Sheet	No. of sheets 20		1 Drum for Sheet	No. of sheets 40
	1 Drum for Instrument set	6 sets		1 Drum for Instrument set	12 sets
	1 Drum for Inj. RL	6 bottles		1 Drum for Inj. RL	12 bottles
	Inj. Viscomet	7 Nos.		Inj. Viscomet	13 Nos.

Report Prepared By :	Note :
Signature of I/C :	
Signature of HOD	

(9) Medicine + Others Weekly Check List (Eye O.T.)

1.	Intravitreal Inj.- Vancomycin / ceftazidime							
2.	Inj. Gentamycin 80 mg.							
3.	Inj. Dexona 2mg.							
4.	Inj. Xylocaine 2%							
5.	Inj. Sensorcaine 0.5%							
6.	Inj. Ampicillin 500 mg							
7.	Inj. Hylaluronidase							
8.	Inj. Pilocarpine							
9.	Inj. Adrenaline							
10.	Inj. 50% Dextrose							
11.	Inj. Sodabicarb							
12.	Inj. Dopamine							
13.	Inj. Anxol							
14.	Inj. Mefentine							
15.	Inj. Hydrocortisone							
16.	Inj. Deriphylline							
17.	Inj. Atropine							
18.	Inj. Fortwin & Inj. Phenargan							
19.	Inj. Distilled Water							
20.	Inj. Pentothal 0.5 mg.							
21.	Inj. Calcium Gluconate							
22.	Inj. Avil							
23.	Inj. Lasix							
24.	Inj. Viscomet							
25.	Suction Machine (Big)							
26.	Torch-3							
27.	Anaesthesia Trolley with 0_2 N_2O Cylinder							
28.	Scissors (Big)2							
29.	IV SET....							
30.	Scalp vein							
31.	Pulse oxymeter							
32.	Inj. Mannitol (100 ml)-5							
33.	Inj. Mannitol (350 ml)-5							
34.	Inj. Ringer Lactate-5							
35.	Inj. 5% Dextrose-2							
36.	Inj. 5% Glucose saline							
37.	Oxygen cyl., pressure gauge & flow meter							
38.	Ambubag mask, Laryngoscope & blades							
39	Endotracheal Tube No.3.5 to 9							

Report filled up by: OT In charge Sign:

Verifying Doctors Sign:

(10) Daily OT Report

Date: OT Start time: OT End Time: Total time:

Name of doctors attended	Name of Nurses attended	Name of Assistants
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6

Note: Enter data in box Information about patients Operated

A. ADULTS : AGE Group

Male: 15 to 35: ☐

35 to 50: ☐

50 to 60: ☐

Female: 15 to 35: ☐

35 to 50: ☐

50 to 60 ☐

B. CHILDREN AGE Group

Infant: < 1 Yrs: ☐

Boys: 1 to 15: ☐

Girls: 1 to15: ☐

Details about type of operation done:

1. Total cataract ☐
2. Phaco with IOL ☐
3. Non- phaco with IOL (SICS / ECCE) ☐
4. IOL ☐
5. NON IOL ☐
6. Combined cataract with AGS ☐

1.Squint ☐
2. Lid Surgeries ☐
3. DCR ☐
4. Glaucoma ☐
5. Pterigyum ☐
6. Vitrectomy ☐
7. Retinal Detachment ☐
8. Chalazion ☐
9. Corneal / Scleral Tear Repair ☐
10. Minor ☐

Complications:

(11) Daily Check List of Anesthésia Trolley

SL. No. Particulars Date

1. Cleaning of anesthesia trolley
   - Do Dusting
2. What should be available on trolley
   - Top Tray includes
     - No. 2.5 to 9 Endo Tracheal tubes
     - Small / large catheter for suction
     - No. 0-4 face mask
     - Xylocaine jelly
     - Halothane bottle
   - Middle tray includes
     - Laryngoscope with its 3 blades
     - Connection - connecting trolley & tube

Injection Tray
- Inj.
- Filled up Inj. for (G.A)

Ampoule
- Atropine
- Adrenaline
- Mephentine

   - No. 0-4 oral airways
   - Connected cylinders filled with Nitrous & Oxygen
   - Small / Large size spanner
   - Both circuit
     - Upper (Bains)
     - Lower (Closed)
     - Children (Pediatric)
   - Lower tray

* Adult & paediatric ambubag with valve & mask

3. Things needed by Anesthetist except trolley
   - Instruments
     - Cardiac monitor
     - Pulse Oxymeter
     - B.P. Instruments
     - Stethoscope
     - Suction machine
   - Medicines
     - Spinal and G.A. Injection
     - Emergency drugs
     - Intra venous fluids

   Filled up by:
   OT In charge Sign:

- Additional things lying on the trolley may be shifted to their respective places.
- Cloth covering trolley should be changed every week. Old one should be sent for washing.

(12) Weekly Autoclave Report

Autoclave Report from _____ to _____, Report prepared on _____

Autoclaved by		Eye OT	Labour Room	Casualty	I. C. U.	Baby Room	Nur. Stn.	O.P.D.	Total
Monday	**Small**								
	Big								
	Tray								
Tueday	**Small**								
	Big								
	Tray								
Wednesday	**Small**								
	Big								
	Tray								
Thursday	**Small**								
	Big								
	Tray								
Friday	**Small**								
	Big								
	Tray								
Saturday	**Small**								
	Big								
	Tray								
Total									

Day	Total Operation for the day	Operation done	Autoclave No.				Total drum + Tray	When needed Autoclave started in morning	Note
			1	2	3	4			
Sun.									
Mon.									
Tues.									
Wed.									
Thurs.									
Fri.									
Sat.									

Report Prepared By :	Note :
Signature of I/C :	
Signature of HOD	

N. B. : This report is meant for SEWA Rural hospital - a general hospital.

(13) Weekly OT staff posting Report

Period from :_____ to _____

(1) Staff

Day	Block	Circulation	Assistants						Field Staff	Note about Leave
			1	2	3	4	5	6		
Mon.										
Tues.										
Wed.										
Thurs.										
Fri.										
Sat.										
Sun.										

Remarks_____

(2) OT Boy :

Day	Eye OT		Autoclaving
	Main OT	Minor OT	
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

(3) OT Ayah :

Day	Eye OT	Linen Washing	Instrument cleaning	As per need
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				
Sunday				

Remarks :_____

Prepared by ;_____ **Sign of I/C :**_____ **Sign of HOD :**_____

(14) Oxygen - Nitrous Cylinder Weekly Report

Total 13 Oxygen (Small)

14 Oxygen (Big)

14 Nitrous (Small)

SL. NO.	Item	Filled	Used	Pending	Empty	Total
1.	Oxygen					
	Small					
2.	Oxygen Big					
3.	Nitrous					

Remarks :_____

Prepared by ;_____ **Sign of I/C :**_____ **Sign of HOD :**_____

(15) Check List of Work to be done by OT boy on Sunday

SL. No.	Particulars	Month/ Date	Reason if not done
1.	Autoclave of OT		
2.	Cleaning of preparation room of OT		
3.	Cleaning of Autoclave room		
4.	Rolling of linen		
5.	Help if emergency OT takes place		
6.	Folding & arranging OT dress in the changing room		
7.	Leave for home after checking G/A Trolley with Oxygen / Nitrous cylinder		
8.	While preparing Gloves, rotten Gloves may be discarded		
9.	Chlorination of water in the tank		
10.	Cleaning of Betadine bottle & liquid soap & its autoclaving.		

Remarks :_____

Prepared by ;_____ **Sign of I/C :**_____ **Sign of HOD :**_____

(16) I. O. L. Monthly Report :

Stock position of IOL for the month of _____											
Sr. No.	**Opening Balance**	**Reccipt**				**Total Stock**	**Use**				**Closing Stock**

Power distribution of IOL as per the balance above

No.	Diopter	Opening balance	Stock received till end	Stock used till end	Balance end	Demand	Remarks
1	<18						
2	18						
3	18.5						
4	19						
5	19.5						
6	20						
7	20.5						
8	21						
9	21.5						
10	22						
11	22.5						
12	23						
13	23.5						
14	24						
15	24.5						
16	25						
17	25.5						
18	26						
19	26.5						
20	27						
21	> 27						
	L) Total						

Remarks :_____

Prepared by ;_____ **Sign of I/C :**_____ **Sign of HOD :**_____

(17) Monthly over of O.T. Boy

SL.No.	Particular	Month / Date
1	Are coils of all autoclave Machine in order?	
2	Are coil, Pin, Ring of all autoclave Machine in position?	
3	Are E.T.O. machine & High speed Machine functional?	
4	Is table for preparation clean and well set	
5	Is autoclave room thoroughly clean?	
6	Are broken, punctured drums, tray segregated?	
7	Is daily autoclave report prepared everyday ?	
	Note : Signature of person handing over Signature of person taking over Signature of OT Incharge Signature of verifying person	

18. Autoclave Log Book

Date	Particular	On time	Pre vacuum	Steam pressure	Sterlization	Steam Release Time	Dry Time	Total Time	Remark

(19)PREPARATION AND CONCENTRATION OF DISINFECTANTS

Formaldehyde and gultaraldehyde

- For surface cleaning: 200 ml in 10 liters (2%)
- For fogging: 2% Hydrogen peroxide and silver nitrate
- For surface cleaning make 5% for the solution : add 250 ml in 5 liters of water
- For fogging: make 20% concentration of solution (200 ml in 1000 ml)
- Sodium Hypochlorite 75 ml in 12 liters of water (1%)

(20) PHYSICAL PARAMETERS FOR OPERATING ROOM VENTILATION :

Parameter	Desired range
Temperature	20-230C
Relative humidity	30-60%
Air movement	from clean to less clean areas
Air changes	Minimum 15 total air changes per hour

(21) Microbiological Parameters, Proposed Frequency of Sampling and Desired Results

Microbiological parameters	Proposed frequency of sampling	Desired result
Monitoring of Sterilization precess by biological indicators	Monthly	No failures
Monitoring of the OR environment for BCP load	Weekly Especially where the theatre dose not have air handing units with adequate filters etc. and physical parameters are not strictly adhered to and monitored	Bacterial load should be less than 12 colonies when done by sedimentation method using 10 cm diameter agar plate
Assessment of the OR surfaces for presence of Clostridium Spores	Utility not very clear except for ensuring cleanliness	Clostridium spores be absent
Evaluation of operation theatre staff for carriage of S. Aureus and B hemolytic streptococci'	Twice a year or more	Carriers and shedders should be adequately treated and reassessed
Air conditioning units for variable fungal contamination	In dry climatic conditions, 3-4 times in a year. In humid climatic conditions, Monthly	Growth of fungi, adequate disinfection and cleaning measures should be instituted in case of detection
Disinfectant in use	Monthly	Should adhere to established microbiological standards

(22) OUTBREAK POICY:

Definition:

An increase in the isolation rate of organisms or clustering of clinical cases in the same time frame suggests an Outbreak.

Factor suggesting an outbreak:

- A laboratory report of a bacteriology specimen grows an alerting organism.
- Two or more patients are found to have an infection attributed to a species not previously documented
- Particularly if it has occurred after a surgical procedure.
- The clinician of the ward staff reports multiple infections of a similar nature.

Investigation of an outbreak

- An outbreak is an infection control emergency: measures should be taken as soon as an outbreak is suspected
- Begin preliminary evaluation and determine a background rate of infection
- Confirm the existence of an outbreak
- Confirm the diagnosis that may include laboratory and clinical data. Start with a broad case definition that can be redefined at a later data.
- Develop line listing by identifying and counting cases or exposure. Describe the data in terms of time, place and person. Remember that cases may have been discharged from the health care facilities.
- Take immediate control measures. Determine who is at risk of becoming ill. Look at changes that may have affected the rate of infection e.g. new staff, new procedure, new laboratory tests, and health care worker: patient ratio, etc.
- Communicate information to relevant personnel
- Screen personnel and environment as indicated.
- Write a coherent report (preliminary and final)
- Summarize investigation and recommendation to the appropriate authorities
- Implement long-term infection control measure for prevention of similar outbreaks

PERIODICAL TESTS DONE BY INFECTION CONTROL COMMITTEE

Test done on	Tested for	Frequency
1. Potability of water	a. Biochemistry: level of chlorine	Every fortnight
2. Air Sampling of OT	b. Any gram positive bacilli and cocci, gram negative cocci, fungi	Every week
3. Food Handlers	c. Stool for salmonella or other parasites	Biannually

Reference: Infection Control Guidelines, Hinduja Hospital, Mumbai

(23) Method of Operating Horizontal High Speed Sterilizer

1. Fill water up to the marking in the glass tube. For filling water, keep the upper multiport valve on vacuum and open the lower water inlet valve.
2. Close the water inlet valve after filling the water up to the marking. If more water is filled then extra water can be removed by opening the water removal valve.
3. Now switch the multiport valve from vacuum to close.
4. Turn on the main switch. A red indicator light will be shown on the main board (box).
5. Switch on the heater - green indicator light will be shown and the heater will be on.
6. When the jacket pressure gauge shows 2.1 kg pressure (up to the red arrow shown) the heater will get turned on and off automatically with the help of contactors.
7. Then open the chamber and load the drums. Close the chamber tightly.
8. Close the Drain Line valve and steam inlet valve.
9. Open the vacuum pump valve and vacuum pump water valve.
10. Switch on the vacuum pump switch.
11. When both the vacuum gauge shows 20 lb. Pressure, close the vacuum valve and water valve. Then switch off the vacuum pump.
12. Open the Drain Line valve and steam inlet valve.
13. Then put the Multiport valve on sterilize mode. Then the chamber gauge will show 2.1lb. pressure and Temperature gauge will show 134.
14. After the temperature is 134 wait for 5 minutes. Then put the multiport valve on fast exhaust and the chamber gauge will come down to 0 (zero)
15. Then to start the vacuum system, repeat No. 08, 09 and 10. The vacuum gauge will show 20 Lb. vacuum .
16. Open the vacuum breaker valve for 10 minutes. Then vacuum gauge will show 0 (zero) pressure. Open drain line valve and steam inlet valve. Close the vacuum valve and water valve. Switch off the vacuum .
17. Switch off the heater.
18. Close the vacuum breaker valve.
19. Open the chamber. Switch off the main switch. Unload the drums.
20. Put the multiport valve on vacuum mode at the end.

(24) Method of Operating Vertical Autoclave

- Wear the cap and mask after washing the hand.
- First of all, open the valve of the glass tube of the autoclave.
- Fill distilled water up to the mark in glass tube and Close the valve.
- Prepare the drum as described previously on page no. 9&10 and paste autoclave strip outside and inside the drum in its upper, middle and lower part.
- Open the window of the drum and put it in autoclave machine.
- Close the door of the autoclave machine so as keys remain in front of each other.
- Close the pressure valve which is on the door and Air valve in the lower part of the machine
- Insert the pin in the plug and switch on.
- Once pressure builds up to 20 PSI and temp. 121 Deg. Centigrade, maintain it for 30 minutes before the machine is switched off.
- Immediately open the lower air valve fully and release steam quickly. After 5 minutes, open all the pressure valves of the lid.
- Allow steam to get released and then open the door of the autoclave.
- After hand washing, remove the drum from the autoclave machine. Immediately close the window of the drum.

Vertical Steam Sterlizer

N.B.:-

- Make sure to drain out the water from the autoclave machine every 15 days.
- Use Distilled water.
- Ensure servicing of the autoclave machine every 6 months.

(25) UNIVERSAL PRECAUTIONS :

BODY SUBSTANCE:

Blood, Urine, Oral Secretions, Faeces, Semen, Mucous, Pus, Wound or other drainage

WASH

Before touching Blood and Body substance

GOWN

When soiling is likely to occur

MASK AND GOGGLES

When it is likely that eyes or mucous membranes will be splashed with blood or body fluids.

SHARPS

Place needles in shapes container DO not recap

WASTE

Use Red plastic bag for disposal of infection waste

LINEN

If linen is heavily soiled with body substances, double wrap it before placing it into red laundry bag

(26) Instructions for Post Operative Cataract surgery patients

1. Remove Eye patch after reaching home. You should put eye drops regularly as prescribed.
2. Wear Dark Glasses for $1^{1}/_{2}$ months.
3. Follow up on the date which is written on discharge card is very important.
4. Prevent entry of water, dust, fumes, rubbish into the eye for $1^{1}/_{2}$ months after surgery.
5. Don't lift heavy weight for $1^{1}/_{2}$ months.
6. Don't massage your eye.
7. Immediately report to the hospital if eye becomes red or there is sudden dimness of vision.
8. No need of any kind of dietary restriction, take regular (routine) diet.
9. Take medicine regularly if you are having diabetes or hypertension or any other medication.
10. Do not sleep on the side of operated eye to prevent injury to it while sleeping.
11. It is necessary to wear spectacles even if intra ocular lens is implanted. You should come back after $1^{1}/_{2}$ months for final refraction and prescription of spectacles.
12. It is important to put eye drops for $1^{1}/_{2}$ months after surgery. It may cause harm to your eye if you do not put eye drops properly.
13. If there is some problem in retina or cornea pre operatively, other than cataract, less vision is expected than normal after the surgery.
14. Send your relatives and neighbours to the hospital who are having dimness of vision..
15. Prevent injury to the eye from fingers of children.
16. Immediately come to hospital after any kind of injury to the eye.

(27) IMPORTANT CONSIDERATIONS IN ASPEPSIS AND STERILIZATION

Pathways to Sepsis and Asterility: General

1. Preparing all trolleys before hand
2. Relying on unconventional method (Boiling)
3. Unsterile person completing a trolley using a chittle forceps.
4. Throwing around soiled linen and cover etc.
5. Discarding swabs used for skin preparation onto the floor
6. Scrubbed persons leaning over an unsterile area
7. Unscrubbed persons reaching over a sterile area
8. Sterility is doubtful but decide to use the same
9. Linen is soaked with moisture, still using it

Pathways to Sepsis and Asterlity: Patient preparation

1. Not specifically ruling out adnexal (eg. Dacryocystitis) and ocular surface infections
2. Operating in presence of active septic foci
3. Performing repeated contact procedures (e.g. Applanation, biometry)
4. Unclean patient attire and exposed scalp hair
5. Improper surgical painting
6. Uncovered nostrils and eyelashes (drape plus opsite)
7. Not washing away mebomian secretions
8. Not washing conjunctival sac with povidone iodine

Pathways to Sepsis and Asterility: Surgeon factors

1. Exposed scalp hair and nostrils
2. Operating inspite of an open wound
3. Improperly scrubbed hands
4. Ungloved hands
5. Getting irrigation fluid all over: trolley surface, gown, drape etc.
6. Not checking indicator tapes (autoclave, ETO etc.)
7. Not checking irrigating fluid for particulate matter / presence and concentration of antibiotic
8. Inadvertently touching an unsterile area but not changing gloves
9. Same irrigation line used for several surgeries
10. Re-using instruments from trolley of another patient directly
11. Reusing dropped instruments without adequate resterilisation
12. Inserting dropped IOLs after wash!
13. Leaving eye predisposed:
    - Improper valve
    - Wound gape
    - Exposed suture knots
    - Vitreous wick

Pathways to sepsis and asterlity: instruments Factors

Pay special attention to:

Tubular instruments (eg. Cannula)

Devices with anti peristaltic pumps and reflux mechanism (eg. Phaco / vitrectomy machines): Ensure suction bottle is empty and sterile.

Reference: Government of India Guidelines, NPCB

(28) Sterilization Protocol at a Glance :

AREA	PROCEDURES	ACCEPTED PRACTICE
No. of Standard Surgical Sets	1. One surgeon with one OT Table : 4 Sets 2. One surgeon with two OT Tables : 7 Sets 3. One Junior Surgeon with one OT Tables : 2 Sets	
Cleaning Procedures	Manual Cleaning	Use Four Bowls. First wash is with the Disinfectant and cleaned with a soft tooth brush. Then followed by three washes with Distilled water.
Blunt Instruments	Prior to Surgery	Steam Sterilization
	Between cases	Flash Autoclave
Sharp Instruments	Prior to Surgery	Hot air oven / ETO
	Beetween cases	Flash Autoclave
Heat Labile Instruments	Vitrectomy Cutter & Cautery	ETO
Linen	Surgeons Dress	Steam Sterilization
	Aprons	Steam Sterilization
	Drape Sheets	Steam Sterilization/Disposables
Hand Washing	Prior to Surgery	Hand Scrubbing with Povidone lodine Scrub or Chlorhexidine for seven minutes
	Between cases	Rescrub Every two Surgeries, change gloves after enach surgery
Surgical Supplies	Irrigation Solution/RL (Glass Bottles)	Steam Sterilization before opening the seal.
Theatre Sterilization/ Disinfections	Floor	1% Sodium Hypochlorite Chlorhexidine, Lysol.
	Fumigation of OT	Formaldehyde Alternated with Glutaraldehyde+ formaldehyde combination, Hydrogen peroxide 1%
	Air Conditioners	Filters to be removed and washed with soap and water weekly.
	Walls	Washed with water and Disinfectant weekly.
	Theatre Trolleys	Disinfectant
Patient	Dress for OT	Washed Gown, Cap and Leggies
	Disinfection of conjunctival Sac	5% Povidone lodine
Suture	Prior to Surgery	ETO (if the pack has been opened but only once)
	Between cases	Used only after Autoclaving

Reference : Aravind Eye hospital Manual - Sterilisation and aseptic practices

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INTERNATIONAL CODE OF MEDICAL ETHICS

Adopted by the third General Assembly of the World Medical Association at London, England, October 1949

Duties of Doctors in General

A DOCTOR MUST always maintain the highest standards of professional conduct.

A DOCTOR MUST NOT allow himself to be influenced merely by motives of profit.

THE FOLLOWING PRACTICES are deemed unethical a) Any self advertisement except such as is expressly authorised by the national code of medical ethics.

b) Taking part in any plan of medical care in which the doctor does not have professional independence.

c) To receive any money in connection with services rendered to a patient other than the acceptance of a proper professional fee or to pay any money in the same circumstances without the knowledge of the patient.

UNDER NO CIRCUMSTANCES is a doctor permitted to do any thing that would weaken the physical or mental resistance of a human being, except from strictly therapeutic or prophylactic indications imposed in the interest of the patient.

A DOCTOR IS ADVISED to use great caution in publishing discoveries. The same applies to methods of treatment whose value is not recognised by the profession.

WHEN A DOCTOR IS CALLED UPON to give evidence or a certificate he should only state that which he can verify.

Duties Of Doctors To The Sick

A DOCTOR MUST always bear in mind the importance of preserving human life from the time of conception until-death.

A DOCTOR OWES to his patient complete loyalty and all the resources of his science. Whenever an examination or treatment is beyond his capacity he should summon another doctor who has the necessary ability.

A DOCTOR OWES to his patient absolute secrecy on all which has been confided to him or which he knows because of the confidence entrusted to him.

A DOCTOR MUST GIVE the necessary treatment in emergency, unless he is assured that it can and will be given by others.

Duties of Doctors to Each Other

A DOCTOR OUGHT to behave to his colleagues as he would have them behave to him.

A DOCTOR MUST OBSERVE the principles of "The Declaration of Geneva" approved by the World Medical Association. October 1949

DECLARATION OF GENEVA

Adopted by the General Assembly of The World Medical Association at Geneva, Switzerland, Sept.1948

MEMBER OF THE MEDICAL PROFESSION:-

- I SOLEMNLY PLEDGE myself to consecrate my life to the service of humanity
- I WILL GIVE to my teachers the respect and gratitude which is their due;
- I WILL PRACTICE my profession with conscience and dignity;
- THE HEALTH OF MY PATIENT will be my first consideration;
- I WILL RESPECT the secrets which are confided in me;
- I WILL MAINTAIN by all means in my power, the honour and the noble traditions of the medical profession;
- MY COLLEAGUES will be my brother;
- I WILL NOT PERMIT considerations of religion, nationality, race, party politics or social standing to intervene between my duty and my patient
- I WILL MAINTAIN the utmost respect for human life, from the time of conception; even under threat, I will not use my medical knowledge contrary to the laws of humanity;
- I MAKE THESE PROMISES solemnly, freely and upon my honour.

As long as I live
So long do I Learn

- Sri Ramakrishna

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