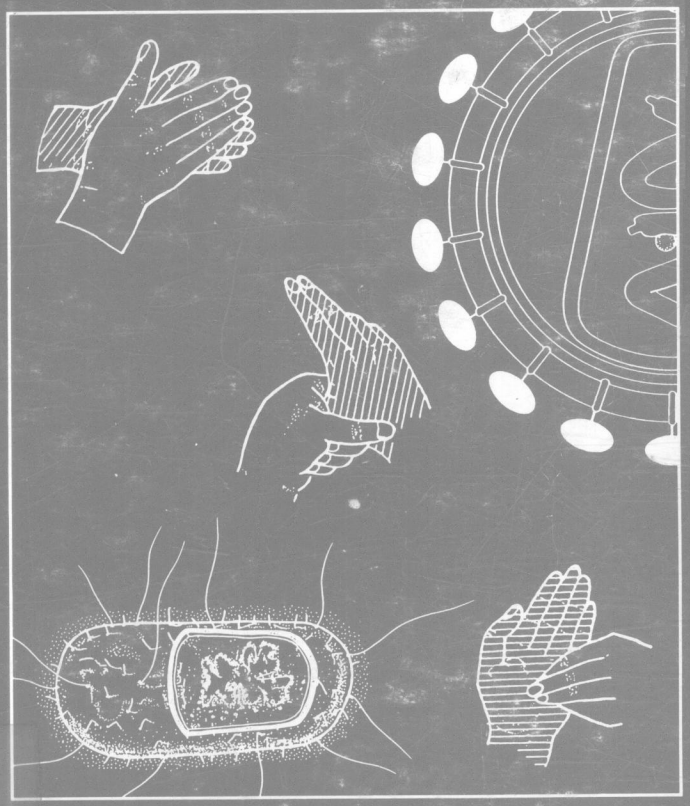
Procedures for Infection Control



The Prince Philip Dental Hospital
The University of Hong Kong

PROCEDURES FOR INFECTION CONTROL

Procedures which must be followed by all staff and students

in The Prince Philip Dental Hospital

Dental Advisory Committee

Subcommittee on Infection Control

Prince Philip Dental Hospital

and

Faculty of Dentistry

The University of Hong Kong

September 1992

CONTENTS

INTRODUCTION

Microbes such as bacteria and viruses continuously populate our living environment. For example, saliva, blood, skin and mucous membranes may harbour microorganisms causing diseases such as the common cold, influenza, pneumonia, rubella, measles, tuberculosis, herpes, syphilis, hepatitis B and human immunodeficiency virus infection (virus causing AIDS), to name but a few. The number of healthy carriers of infection (*eg* hepatitis B) and persons with subclinical and otherwise unrecognized infections is far higher than the identified cases. Hence, each patient must be considered as potentially infectious, and meticulous infection control procedure should be adhered to at all times.

> To achieve a satisfactory standard of infection control it is essential to develop a high level of awareness of the cleanliness of your technique, your attire and the environment of the clinic.

It is noteworthy that in Europe and North America universal infection control measures have been recommended when treating all patients (i.e. treating all patients as though they were carriers of infectious diseases). It is the aim of the Infection Control Subcommittee to implement this commendable objective. However, due to reasons of practicality and resource limitations a two-tier approach to infection control is currently recommended. This entails,

- treatment of routine patients without an apparent communicable infection by implementing reasonable standards of infection control and,

- treatment of 'high risk' patients with special precautions as described in Appendix I.

> *The Part 1 of this document (pages 6-9) outlines the theory of infection control.* ***Those who are conversant with the basic principles of infection control may feel that they can pass over this section and proceed to Part 2 on the practice of infection control appertaining to this hospital (pages 10-31).***

Note

If necessary, further clarification and rationale for the procedures recommended in this document can be obtained by contacting any member of the Infection Control Subcommittee:

1.	Dr. M.B. Comfort, Senior Lecturer (OMFS)	Phone 859 0264
2.	Dr. L.P. Samaranayake, Reader (OBU)	Phone 859 0484
3.	Dr. H.P. Philipsen, Reader (OBU)	Phone 859 0483
4.	Dr. P.C. Wu, Reader (OPU)	Phone 859 0352
5.	Miss M.A. Crosswaite, Tutor in DSA	Phone 859 0325
6.	Mr. M.E. Peake, Comptroller, PPDH	Phone 859 0335
7.	Ms. M. Chan, Hospital Administrator, PPDH	Phone 859 0334
8.	Prof. S.H.Y. Wei, Dean	Phone 859 0342

Part 1

Theoretical Aspects of Infection Control

1. Introduction

The following outline of basic principles of infection control may help you understand the fundamental concepts of infection control. As it is not the intention of the sub-committee to produce a comprehensive treatise, the reader is urged to consult the references at the end of this document for detailed descriptions of the theory and practice of infection control in dentistry.

2. Contaminated, clean and sterile items

Objects may be classified as i) contaminated (*eg* with blood or saliva), ii) sterile or iii) clean (neither contaminated nor sterile). Whereas a sterile object is devoid of any microorganisms a clean object may carry a very small load of non-pathogenic organisms. In other words, cleaning reduces the bio-burden to an acceptable level for the procedure in question. A contaminated object, by definition, carries either a small or large load of pathogenic organisms.

A cardinal rule to remember is that when an object in a higher category of cleanliness comes into contact with an object in a lower category its status will be converted to that in the lower category. For example, when a person wearing a contaminated glove reaches into a box of masks to remove a mask, then that and other masks in the container are contaminated.

3. Transmission of infection

In the dental clinic and laboratory, infections may be transmitted between patients and personnel in several ways as outlined below (Figure 1).

- Transmission by DIRECT CONTACT from one person to another.

  Prevention: by hand disinfection and by wearing gloves.

- Transmission by INDIRECT CONTACT occurs when a person acquires microorganisms from contaminated objects (*eg* instruments, work surfaces, patient folders, impressions).

  Prevention: by sterilization, disinfection and no-touch techniques.

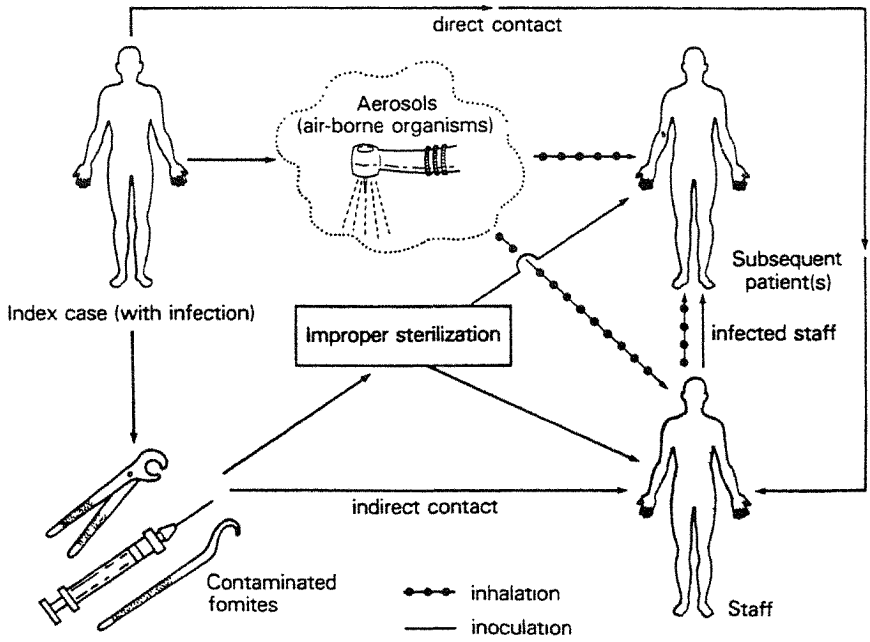


Figure 1 Routes and modes of infection transmission in the dental clinic (From Samaranayake LP, *Dent Update* 1989; *16*: 58-63, with permission).

- Transmission by INOCULATION takes place, when microorganisms are introduced into the body through either a pre-existing lesion or a lesion produced by a contaminated instrument, needle or scalpel. In this way even microorganisms unable to penetrate intact skin and mucosa may be transmitted, notably hepatitis B virus and human immunodeficiency virus (HIV) which may be present in blood.

Prevention: by sterilization, use of disposable needles, and safe handling and disposal of sharp items.

- Transmission by the AIRBORNE ROUTE leads to inhalation of, or eye infections from, contaminated droplets, aerosols, dust, pumice, and particles of calculus or dental materials. The risk is especially high when using three-in-one syringes, water-cooled drills and ultrasonic scalers, or when polishing dentures and appliances.

  Prevention: by use of suction, rubber dam, face mask, glasses, and clinic attire, as well as by disinfection of work surfaces.

4. Sterilization, disinfection, and cleaning

STERILIZATION

Sterilization is a process by which all forms of microorganisms are destroyed, including viruses, bacteria, fungi, and spores. The major modes of sterilization used in dentistry include 1) moist heat (autoclaving using steam under pressure), 2) dry heat, 3) and gaseous chemicals (chemiclave; not used in PPDH). Under appropriate conditions, immersion of objects and items in disinfectants is another method of obtaining sterility. This is sometimes termed "chemical sterilization" although the correct term is high level disinfection.

DISINFECTION

Disinfection aims at eliminating pathogenic microorganisms in order to prevent transmission. Methods of disinfection include the use of moist heat at lower temperatures (*eg* boiling water) or the use of chemical disinfectants and antiseptics.

Major groups of chemical agents used in dentistry are glutaraldehydes (by far the most commonly used), chlorine and iodine compounds, alcohols, phenols, and chlorhexidine. Antiseptics are mild disinfectants which can be used on skin and mucosa. Disinfection lacks the safety margin achievable by sterilization and usually does not destroy bacterial spores.

The effectiveness of a disinfection procedure depends on a variety of factors including i) the number and nature of contaminating microorganisms, ii) type and concentration of the agent used, iii) length of exposure, and iv) amount of residual organic matter present (i.e. bioburden) on the item. The result of disinfection varies from sterility at one extreme to a minimal reduction of microbial numbers at the other.

CLEANING

Cleaning is the removal of visible dirt by means of water, soap, detergent, brush, cloth, or vacuum cleaner. Cleaning reduces microbial density, but may leave large numbers behind. It is essential that all objects and items are cleaned thoroughly prior to disinfection or sterilization.

Part 2

Practice of Infection Control

The following procedures must be followed by all staff and students in order to prevent the *risk of cross infection of communicable diseases* in dental clinics and diagnostic and technical laboratories.

The following ***procedures for infection control*** are intended to protect patients, students, and clinical and technical staff against infectious diseases transmitted via the clinical and technical procedures undertaken during patient treatment in The Prince Philip Dental Hospital. They are modified from the recommendations of the American Dental Association (JADA 1988; 116: 241-248), the modifications being due to financial and practical limitations.

These procedures must be followed at all times.

Special procedures for operating theatres, technical laboratories, pathology and microbiology laboratories, clinical photography, and treatment of known infectious cases are included as Appendices (I - VI) to this document. These special procedures must be followed at all times in these areas.

5. Patient Evaluation

A thorough medical history should be obtained from each patient. All patients with known serious infections (*eg* tuberculosis, syphilis, hepatitis B, HIV infection, AIDS) as well as haemophiliacs (who may have become infected through blood products) should be treated in clinics set aside for such cases. Details of the procedures to be followed are given in Appendix I.

Staff and students who are carriers of hepatitis B can perform clinical duties provided they adhere to infection control procedures.

6. Personal Protection

VACCINATIONS

All oral health care workers should have received the vaccinations recommended for the general population of Hong Kong, including vaccinations against tuberculosis and, for young women, rubella. In addition all clinical personnel and students should be vaccinated against hepatitis B. Blood tests and vaccinations for hepatitis B can be carried out free of charge by arrangement with the University Health Service (in the case of University staff and students) or the Hospital Administrator (in the case of PPDH staff).

PERSONAL HYGIENE IN THE CLINIC

Hair should be short or tied back. Beards must be well-trimmed. Fingernails must be short and free from nail polish. Cuts and abrasions on hands or arms must be covered with clean waterproof adhesive dressings or rubber finger stalls. Rings, bracelets and watches should not be worn. Briefcases and handbags must not be taken into the clinics or laboratories.

CLINIC ATTIRE

Approved clinic attire must be worn when examining and treating patients and assisting in or observing such procedures. Clinic attire can be a two-piece uniform, a white coat, or a protective gown and should cover skin and clothing to protect against blood and saliva. In cold weather, extra clothes must be worn under the uniform and not over it. Clinic attire should not be worn outside the clinics, and certainly not outside the hospital. Contaminated and stained attire must be changed as soon as possible and laundered. A normal washing cycle at high temperature (at least 60^{0}C) will provide adequate disinfection.

MASKS

Surgical masks should be worn when examining and treating patients and assisting in or observing such procedures. Masks protect the patient from microorganisms from the operator's mouth and nose, and the operator from aerosols, spatter and particles from the patient's mouth. Masks must be removed before leaving the clinic and must not be left hanging around the neck.

PROTECTIVE EYEWEAR

Patients and personnel must wear spectacles (preferably with large frames) or special protective eyewear to avoid getting saliva, blood, drilling debris, pumice, or particles of calculus, amalgam etc. into the eyes. Similarly the eyes of supine patients should be always protected.

HANDWASHING

Handwashing can be categorised into clinical handwashing and surgical handwashing. Both procedures are really hand disinfection techniques.

Clinical handwashing

Clinical handwashing is intended to eliminate pathogenic microorganisms contaminating the hands, and possibly reduce the resident microflora. The aim is to prevent cross infection by direct and indirect contact. All personnel must develop a good hand washing technique such as shown in Figure 2.

Method for clinical handwashing

- Remove watches, rings, bracelets.
- Scrub the nails with a clean nailbrush.

- Wash hands with cool water using a liquid antiseptic hand cleaner (*eg* chlorhexidine) in a hygienic dispenser.

- Wash hands and wrists for one minute. A good hand washing technique (see Fig 2) should be developed by all staff so that all areas of the hand are consistently cleaned.

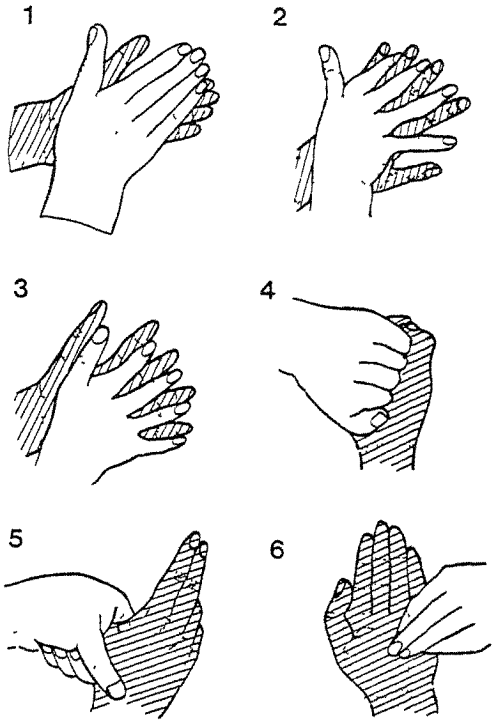


Figure 2 A suggested hand-washing technique. The six movements required for a satisfactory hand wash. 1. The palms 2. the webs between fingers 3. the webs again with altered grip 4. palms to knuckles of opposing hands 5. thumbs clasped in opposing palm 6. tips of fingers against palms of opposing hand (4,5,6 repeated for each hand in turn). Continue washing hands and wrists for one minute (from Samaranayake, Scheutz & Cottone, *Infection Control for the Dental Team*, 1991, Copenhagen, Munksgaard, with permission)

- Do not touch the water tap or soap dispenser with the hands - use an elbow.

- Use a disposable towel and dry thoroughly.

Surgical handwashing

Surgical handwashing is used before surgical procedures. The aim here is to eliminate the contaminating microorganisms as well as to reduce the resident microflora (*eg* Staphylococci) and thereby prevent wound infection.

Method for surgical handwashing

Observe the following modifications of the above method:

- Wash for one minute as above, then scrub the nails for one minute, rinse, and wash again for one minute.

- Dry with a sterile towel.

GLOVES

There are three types of gloves, namely, *surgical* (sterile gloves), *protective* (non-sterile gloves) and *heavy-duty* gloves. In general, gloves must be worn by all staff and students when performing or assisting in the examination and treatment of patients, when handling contaminated instruments, impressions and samples, and when cleaning and disinfecting areas contaminated with blood and saliva. Gloves are intended to protect patients against microorganisms which may be present on the hands of health care workers, and to protect personnel against microorganisms from oral mucosa, saliva and blood of patients.

Note: Any obvious cuts or abrasions on the hands must be covered with a waterproof dressing (*eg* Elastoplast) prior to wearing any kind of glove.

Surgical (sterile) gloves

These must be worn for invasive procedures entailing a breach of the oral mucosa. A new pair should be used for each patient. First, surgical handwashing is performed, then the gloves are put on in a manner so as to avoid contaminating the outer surface. The gloves must not come into contact with any non-sterile objects before or during the operation. If a glove is torn or punctured it must be replaced immediately. After the operation, remove gloves and perform clinical handwashing.

Protective (non-sterile) gloves

These must be worn for all other procedures involving contact with oral mucosa, saliva or blood but which does not result in a breach of the mucosa. Perform clinical handwashing before the gloves are put on and after removing them. Although ideally a new pair of gloves should be worn for each patient, this may not be feasible due to financial reasons. Hence the same pair of gloves may be used for several patients, provided the gloves are washed thoroughly between patients, using an antiseptic hand cleaner. Obviously, if a glove is damaged it must be replaced immediately. *Remove gloves when leaving the clinic or laboratory, do not wear them in lifts or other public areas.*

After removing gloves the hands must be washed using the clinical hand washing technique described above, but without brushing the nails.

Heavy duty gloves

These must be worn when cleaning and scrubbing instruments, washing and cleaning the floors areas and during removal of contaminated, spilled material.

7. Control of infection after accidental injury

HAND INJURIES

In the case of hand injuries caused by contaminated sharp instruments or needles: remove glove, express blood under running water for one minute, wash with an appropriate antiseptic (*eg* Savlon) and apply a dressing.

EYE INJURIES

If splashes or foreign bodies get into the eyes: rinse with sterile irrigating solution using an eye bath.

> *For all injuries contact either your clinical teacher, the Tutor in Dental Surgery Assisting, or Sister in the Department of Oral and Maxillofacial Surgery to decide if* ***further precautions*** *are necessary.*

Report all incidents to the Hospital Administrator for documentation of the incident.

8. Sterilization and Disinfection Procedures

INSTRUMENTS

Instruments, including handpieces, must be *sterilized between patients* to prevent cross infection. Furthermore, for surgery and endodontic procedures, where sterility is essential, the instruments must be *stored in a sterile state* until use. Instruments only remain sterile if they are sterilized in containers impermeable to microorganisms (e.g. sterilizing bags, or metal trays with tight-fitting covers) and are kept unopened and dry. Although students should learn to clean and sterilize instruments, the work is best carried out by DSAs, nurses or specially trained cleansing staff. It should be done in working areas designated for this purpose.

Preparation of sterile instruments

After use, instruments are,

- Rinsed in cold water.
- Cleaned in an ultrasonic cleaner and/or hand scrubbed with brush and detergent (dishwashing type).
- Rinsed, dried and inspected.
- Packed in suitable containers (covered metal trays, paper, linen, or autoclave bags) and marked with the date.
- Sterilized in the autoclave with a drying cycle, in the Department of Oral and Maxillofacial Surgery, or (for endodontic kits) in a hot air sterilizer.
- Kept sterile in unopened containers until use. Maximum storage time is two weeks.

Preparation of clean instruments

Due to practical limitations, instruments for procedures other than surgery and endodontics are sterilized between patients **without being packed for sterile storage**, and are not sterile unless used immediately. After use, they are treated as follows:

- Rinsed in cold water.
- Cleaned in an ultrasonic cleaner and/or hand scrubbed with a brush and detergent (dishwashing type).
- Rinsed, dried and inspected.
- Packed in perforated boxes.
- Sterilized in the 'Little Sister' autoclaves in the clinic areas.

- Dried in a hot air oven.

- Kept in the boxes in pick up areas. This is not sterile storage. The instruments may become grossly contaminated before re-use if the boxes are opened or left in an environment with dust or aerosols.

Handpieces

Sterilizable handpieces are cleaned and sterilized by the dental surgery assistants after each use according to the following procedure:

- Flushed with water for one minute.

- Dismantled.

- Cleaned.

- Oiled.

- Bagged.

- Sterilized in the autoclave with a drying cycle in the Department of Oral and Maxillofacial Surgery.

- Handpieces which cannot be sterilized (*eg* ultrasonic scalers) are flushed, their barrels cleaned with detergent, dried, and disinfected with an appropriate agent.

Monitoring of autoclaves and dry heat sterilizers

Their efficiency must be checked by DSAs or nurses once a week using spore tests. Chemical indicators (or process indicators) should be used in each load, with indicator tape on each kit. These only indicate that the load has been processed and not necessarily sterilized.

Instruments and equipment which cannot be heat sterilized

These are soaked in or wiped with 2% glutaraldehyde (high level disinfection).

DISINFECTION OF DENTAL UNITS AND CLINIC AREAS

All procedures should be performed in *a way that minimizes the formation of droplets, spatter and aerosols, eg* by using rubber dam, high-speed suction and proper patient positioning. During treatment procedures objects such as cabinets, drawers, patient folders, pens, telephones, glasses or pockets should not be touched. Proper planning ahead prior to gloving will minimise the necessity of touching such items in the middle of a treatment procedure.

Limiting contamination

Objects and surfaces likely to be contaminated during the treatment (*eg* handles) may be protected by wrapping in clear plastic wrap or plastic tubing, which is discarded after each patient. Always be aware of the clinic areas that have been designated as contaminated and uncontaminated areas. Place and use items that should remain uncontaminated only in an uncontaminated area.

Cleaning and disinfection

- **Between patients**, all areas contaminated by contact or spatter must be disinfected by a DSA, student, or hygienist. Pay special attention to the bracket table, three-in-one syringe, ultrasonic scaler, suction and saliva ejector tubing, handle of operating light, dental chair (headrest and operating buttons) and counter top. In case of heavy contamination, clean first with detergent and then disinfect.

- **At the beginning and end of each session,** the dental chair, unit, operator's stool and all work surfaces should be cleaned with disinfectant by DSAs.

  Although alcohol (70%) has been widely used as a surface disinfectant in the past, its effectiveness is limited due to rapid evaporation. Hence one of the newer types of 2% glutaraldehyde solutions *(eg* Banicide) may be a better choice. However due to environmental safety reasons glutaraldehyde is not recommended by some authorities. An ideal surface disinfectant which does not possess these drawbacks is not yet available.

The floors are washed once a day with hypochlorite by cleansing staff. Additional programmes for extra cleaning and scrubbing are introduced according to need.

Dental unit water systems

In order to remove any sediment which might have accumulated in the system overnight, each sink and dental unit must be flushed for one minute by DSAs each morning prior to the start of the clinic operation.

The handpieces and syringe tubing must be flushed for one minute after each patient by the operator or DSA in order to remove any contaminated material which may have been aspirated into the dental unit.

Aspirators

- The tubing of high volume aspirators and saliva ejectors should be rinsed with water between patients by the operator or DSA.

- Aspirator tubing (including filters) should be cleaned as needed and at least once a week, by DSAs using water and aspirator cleanser(*eg* Rotaclenz).

- Catchpots should be cleaned at least once a week with water and aspirator cleanser.

- Filters should be cleaned at least once a month with water and a disinfectant/detergent (*eg* Hibiscrub).

- Mobile surgical suction units should be cleaned at the end of each session with water and a disinfectant (*eg* hypochlorite).

- Large catchpots under units must be dismantled for cleaning at least twice a year by the appropriate staff.

Infection control procedures must be adhered to when taking radiographs and handling film packets in order to avoid transmission of salivary pathogens by direct and indirect contact.

If the X-ray tube, handles, exposure button, or timer are contaminated with saliva, they must be disinfected with 2% glutaraldehyde between patients. Contamination can be avoided either by handling with clean gloves only, or by covering with new plastic wrap for each patient.

Film holders and bite blocks must be cleaned, immersed in disinfectant, and rinsed in water between patients. Film packets must be handled in such a manner to prevent cross contamination.

In known infectious cases plastic bags must be used to cover the films during exposure. Afterwards the plastic bag should be removed without contaminating the film which can then be developed in the normal way. A second or "clean" helper may be used to operate the equipment to avoid its contamination.

IMPRESSIONS, MODELS, DENTURES, APPLIANCES ETC.

Material being transferred between the clinic and technical laboratory should be disinfected in order to prevent transmission of infectious agents between staff/students and patients via impressions, models, etc.

Impressions

Impressions must be carefully rinsed to remove saliva and blood before placing in a sealed bag for transport to the laboratory. Polysulphide and silicone impressions may be disinfected by immersion in disinfectant (*eg* glutaraldehyde). This procedure is used for known infectious cases. Polyether and alginate impressions can only be disinfected with a spray. A new alginate containing an antiseptic agent may be used.

Dentures and appliances

Dentures and appliances must be scrubbed with antiseptic soap before trying in the mouth and again before taking to the laboratory *eg* for grinding or polishing. If used in connection with oral surgery, dentures and appliances must be disinfected for example in Hibitane or Savlon and rinsed in sterile saline before insertion in the mouth. Glutaraldehydes are unsuitable because they are adsorbed to acrylic and have toxic and allergenic effects on the mucosa.

LABORATORY HYGIENE
(See Appendix III)

9 Waste Disposal

- *Needles and other sharp objects including broken glass etc.* must be discarded into *puncture-proof containers.* The containers must then be securely sealed.

- *Waste from known infectious cases* must be disposed of in a thick garbage bag which is placed in a white bag marked 'INFECTIOUS' and securely sealed.

- *Other solid waste* from clinics and laboratories is disposed of in thick *garbage bags*, safely closed. *Liquid waste* should carefully poured into a drain, avoiding spatter, and flushed with water.

- *All waste* should be taken by the departmental cleansing staff to the refuse room on Lower Ground floor (LGl), from where it is collected for incineration by the Urban Services Department.

- The bags marked 'INFECTIOUS' and the puncture-proof containers should be picked up by the special collection service for hospitals.

Appendix I

Procedure for treatment of known high infectious risk patients

1. This would include patients with the following conditions:

    - known HBsAg positive
    - hepatitis
    - liver diseases
    - tuberculosis
    - immunosuppressed
    - suspected or diagnosed HIV infection/AIDS
    - haemophiliacs who have received multiple blood products.

2. All patients known to be infectious must be treated in a side surgery. The appointment should preferably be arranged at the end of the day. All routine dental procedures can be carried out.

3. The operator and assistant must wear long-sleeved disposable gowns, masks, protective glasses and gloves.

4. The patient's clothing must be protected by a disposable barrier sheet secured with tape. A plastic bib should not be worn.

5. For surgical procedures, disposable barrier sheets must be used to cover the bracket table and bench top. For non-surgical procedures, the surfaces must be covered with aluminium foil on top of which a layer of water-repellent paper should be placed.

6. Disposable clear plastic wrap or plastic sleeves fastened with tape must be used to cover the handle of the dental light, the switches on the dental chair, the air rotor and hand piece, the three-in-one syringe, the ultrasonic scaler and their tubing.

7. The mobile suction unit should be used with a disposable or autoclavable suction tip with a disposable plastic sleeve fastened with tape. Central suction must not be used.

8. If radiographs are taken the film must be placed inside a disposable plastic bag before placing in the mouth.

9. Any dental impressions should be taken in polysulphide or silicone impression material which tolerates disinfection. The impressions must be thoroughly rinsed under running water and disinfected by immersion in a glutaraldehyde disinfectant before sending to the laboratory in a sealed plastic bag.

10. Any specimens for the Department of Pathology or Microbiology (OBU) must be placed in the appropriate container. The container and Pathology request form must be marked 'HIGH RISK SPECIMEN'.

On completion of treatment

11. Personnel must wear heavy duty gloves, masks and, if necessary, protective glasses for handling used instruments and for cleaning and disinfecting the surgery.

12. Scalpel blades, needles and anaesthetic cartridges must be placed in a rigid-walled puncture-resistant container, sealed with tape and placed in a thick black waste bag.

13. All other disposable items must also be placed in the waste bag which is then safely closed. The bag must finally be placed inside a second (white) waste bag clearly marked "Infectious" and also closed.

14. The waste bag must be taken to the refuse room on LGl to be collected for incineration by the special refuse collection service for hospitals.

15. All instruments (except those referred to in 16 below) must be rinsed in running water to remove loose debris. They must then be disinfected by immersion in a glutaraldehyde disinfectant, cleaned by scrubbing with detergent, dried, inspected, packed and either autoclaved or dry heat sterilized.

    Note: After autoclaving, all handpieces must be oiled and sterilized again in an autoclave with a drying cycle.

16. The portable suction must be flushed with 0.5% sodium hypochlorite. The bottle must then be filled with sodium hypochlorite and left for at least one hour before cleaning. The contents of the bottle should be poured carefully down the utility sink.

17. All surfaces and equipment must be cleaned with 2% glutaraldehyde.

18. The surgery must not be entered for at least one hour and a notice should be placed on the door to this effect.

Appendix II

Procedure for clinical photography in the Dental Illustration Unit

The patient must be accompanied by a member of the dental team who is responsible for holding mirrors and cheek retractors and for cleaning and disinfection. The photographer should not touch patients or objects contaminated with saliva or blood.

- *Handwashing and gloves*

Before and after photography the clinician should perform clinical handwashing. Protective gloves should be worn.

- *Cheek retractors and mirrors*

These must be washed after use with antiseptic soap, rinsed in running water, and disinfected by immersion in 2% glutaraldehyde solution. Before reuse they are rinsed with water. Mirrors may be polished with 95% alcohol.

Appendix III

Procedure for Technical Laboratories

Dental laboratories must routinely practice infection control procedures to prevent transmission of infectious agents from the clinic or the laboratory, via impressions, models, work in progress and completed work. Impressions from known infectious patients are disinfected in the clinic before transfer to the laboratory. *All cases must, however, be considered a potential risk.* Hence the basic rules for clinical hygiene must be observed in the laboratory (see p 11).

Hygiene measures in the laboratory comprise:

- Vaccinations (see page 11)
- Protective clothes (laboratory coats and disposable aprons)
- Disposable face masks
- Protective eyewear
- Hand disinfection
- Disposable gloves and heavy duty gloves
- Sealed bags or containers for transfer of work to and from the clinic
- Disinfection of table tops, work surfaces, ragwheels, brushes and other exposed equipment
- Shields and suction when using grinding and polishing equipment
- Pumice dispensed in small amounts for individual cases in disposable containers
- Safe disposal of waste
- No eating, drinking or smoking in working areas.

Appendix IV

Procedure for Operating Theatres

Personnel working in the operating theatre must follow a strict protocol to ensure asepsis which includes the following:

- Before entering the theatre all personnel must change into clean theatre clothes. Boots, theatre shoes or plastic shoe covers must be worn and hair must be covered with a paper cap. Masks must be worn at all times.

- The surgical team must perform surgical handwashing before putting on sterile surgical gowns and gloves.

- Sterile instruments must be laid out by the scrubbed nurse on a sterile surface on a trolley. Sterile equipment, drapes and sterile materials, such as gauze swabs and suturing materials, should be added to the trolley. Any equipment within the operative area must be covered to ensure sterility *eg* cover the handpiece cable with a sterile paper sleeve.

- Non-scrubbed personnel in the theatre must take care not to contaminate the operative field by accidentally touching a sterile item.

- At the end of each operating session any equipment in the theatre, work surfaces and the theatre floor must be disinfected.

Appendix V

Procedures for Pathology and Microbiology Laboratories

PATHOLOGY SPECIMEN COLLECTION AND TRANSPORTATION

Note: All specimens must be regarded as potentially infectious.

Specimen containers

Appropriate leak-proof containers or bags must be used for specimens. Never send aspirates for histopathology in syringes (however microbiology aspirates should be sent in recapped syringes as described below).

Histopathology specimens

- For ordinary purposes the specimen should be fixed immediately with an adequate amount of 10% buffered formalin - this amount should be approximately 10 to 20 times the volume of the specimen.

- Use wide-mouthed containers for all specimens. Large specimens must be placed in polythene bags of double thickness.

Cytology specimens

- An equal volume of 50% ethyl alcohol should be added to the fluid specimen immediately after collection. The fixed specimen should be kept in the refrigerator at 4°C when there is a delay in the transport to the laboratory.

- Direct smears should be labelled with the name of the patient on each slide and fixed immediately in 95% ethyl alcohol.

Transfer of specimen to container

- Avoid fouling the outside of the container and that part of the inside which will later be in contact with the cap.

- Never overfill containers.

- Specimens must be kept separate from the request form and kept upright during transmission to the pathology laboratory. Contaminated request forms are a health hazard, and will be returned to the sender together with the specimen.

Unfixed specimens

- Fresh, unfixed tissue is required for enzyme histochemical, immunofluorescence or EM study. In such cases the specimen should be sent immediately to the pathology laboratory. Prior arrangement will be necessary in these cases. Requests for frozen section and immunofluorescence study services will only be accepted after prior arrangement by 5:00 p.m. on the day before the test. If necessary, fresh specimens may be placed on gauze moistened with normal saline, but specimens should not be wrapped in gauze or immersed in normal saline.

- Frozen sections should not be used as a fast alternative to paraffin sections for routine surgical specimens. Frozen sections should not normally be requested for specimens with any known infective agent especially tuberculosis, HBsAg-positive materials and other 'High infective risk' specimens. This will contaminate the frozen section laboratory equipment and expose the staff to an unnecessary health hazard.

"High Infectious Risk" Specimens

Bottles containing high risk specimens must be placed in a sealed plastic bag. The bottle, plastic bag and request form must be labelled 'HIGH RISK SPECIMEN'. The request form must be

placed separately inside a second plastic bag and clipped (*not* stapled) to the bag containing the specimen.

Labelling

All specimens must be accompanied by a properly completed request form providing the required patient data. Each specimen must be properly and legibly labelled. A request or specimen will not be accepted if there is a major discrepancy in labelling between the form and the sample.

MICROBIOLOGY SPECIMEN COLLECTION AND TRANSPORTATION

Note: All specimens must be regarded as potentially infectious.

Procedures described for the Pathology Laboratories in the foregoing section equally applies to the collection and transport of microbiology specimens. One exception however is the aspirated sample of pus which should be sent to the laboratory in the re-capped syringe itself. However, great care should be taken when re-capping the needle to prevent injury.

BIOSAFETY PROCEDURES IN PATHOLOGY AND MICROBIOLOGY LABORATORIES

Tissues, body fluids and secretions are capable of transmitting infection depending on the nature of the agents.

- The staff in charge of the laboratories have the responsibility for assessing each circumstance and determining who may enter or work in the laboratory.

- Laboratory equipment may only be used by other personnel when there is a trained technician in attendance.

- Detailed biosafety instructions are displayed in the laboratories and must be observed by all persons using the laboratories.

Appendix VI

References and Further Reading

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