



NATIONAL & KAPODISTRIAN
UNIVERSITY OF ATHENS

SCHOOL OF DENTISTRY

INFECTION CONTROL PROTOCOLS IN DENTISTRY

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**National and Kapodistrian University
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School of Dentistry

When providing dental healthcare it is imperative that a series of measures be applied to prevent the transmission of infections among patients and dental personnel.

The protection of the general health of dental patients as well as any medical and auxiliary staff working in the healthcare settings (dental practice, clinic, scrub nurses, cleaning services) is a basic parameter in dental healthcare provision.

During dental treatment there is a transmission risk of various diseases caused by microbial strains such as herpes simplex viruses (HSV I & HSV II), hepatitis A,B,C and D viruses (HAV, HBV, HCV, HDV), cytomegalovirus (CMV), tuberculosis bacterium (TB), various streptococcus and staphylococcus viruses, candida albicans and the strains of the acquired human immunodeficiency virus (HIV I & HIV II).

Infections can be transmitted in dental practice mainly through immediate contact with blood, saliva and possibly other secretions or through contaminated or inadequately disinfected and sterilised instruments.

In order for the patients' and dental personnel's health to be protected, a series of basic, but also as the case may be, measures are recommended. The basic measures are: a) single-use gloves, b) mask, c) protective goggles, d) appropriate medical clothing, e) surface covering, f) single-use instruments, g) instrument sterilisation, h) surface and flooring sterilisation, i) hand washing, j) injury prevention and, finally, vaccination and immunisation (when possible) of dental personnel.

HAND WASHING

Hand washing is the cornerstone of the 'patient- doctor- auxiliary staff' protection circle against cross-contamination. Any staff working in medical practices (or clinics) are required to wash their hands before and after coming into contact with the patient (or the instruments used) independently of wearing gloves or not during the operation.

Hand washing must be performed meticulously so that every hand surface is adequately cleaned. Special attention must be paid to hand surfaces usually neglected when washed. The pictures illustrate the areas requiring special attention so that hands are properly cleaned. After removing gloves, hands must be carefully washed since pores are present on latex allowing contaminated material to penetrate.

Although frequent washing is a necessity, problems such as dry skin and dermatitis often occur. To prevent such problems it is advisable that special skin moisturising lotions be used. These lotions, moisturising creams etc. must be used at the end of the day as they affect the material of the gloves creating micro holes. As a consequence, the gloves provide no protection whatsoever.

In most kinds of dental work, water and soap followed by an antimicrobial solution are sufficient. In case of an injury, scratch or exudative injury the person should wait until the wound is healed. If this is not possible, the use of a double pair of suitable and tolerable gloves is recommended. Furthermore, as regards antimicrobial solutions, although their use is not required, solutions with prolonged action are preferable.

The contribution of the latter in hand antisepsis is crucial as micropores either preexist or are formed while being used allowing oral fluids and blood to penetrate. The use of an antimicrobial solution with prolonged action adequately protects hands against the development of microorganisms on the hand surface below gloves.

Using antimicrobial solutions without prior meticulous hand washing is a defective and inefficient procedure.

Alcohol antiseptic solutions or gels are effective in destroying germs on the hand surface, provided that adequate cleaning has been preceded.

A solution can have a prolonged antiseptic action only if it contains an antiseptic agent such as chlorhexidine, quaternary ammonium compounds, octenidine or triclosan.

STORAGE OF HYGIENE PRODUCTS

On hand cleaning and antiseptic products microorganisms may occur when remaining in dispensers for a long time. For that reason, dispensers should not be filled before the container is completely empty. In any case, dispensers must be washed and dried prior to filling.

Liquid soap dispensers must be kept clean and, of course, washed and dried prior to use.

GLOVES

The medical and auxiliary staff are obliged to always wear latex (or vinyl or nitrile) gloves during any dental work which involves contact with blood or saliva containing blood or mucus. These gloves should not necessarily be sterilized unless an operation is going to take place, particularly on patients with HIV infection.

Hands must be meticulously washed before wearing the gloves while the same procedure must be followed after removing the gloves. Gloves are used during any dental work for a single patient only and, afterwards, they are removed and discarded. **Washing the gloves** and performing any dental work with the same gloves on another patient is strictly forbidden.

Furthermore, sterilising examination gloves is not allowed as manufacture their integrity preservation cannot be guaranteed. Disinfection fluids, essential oils, acrylic monomers, various dental materials and instruments, several skin soaps and lotions may distort the cohesion of the glove material. In patients with confirmed HIV or HBV and HCV infection, it is recommended that **double gloves** be used for the protection of the surgeon. If during any dental work it is necessary to use an extra device or material, gloves should be covered with an extra pair of nylon gloves so that contamination of those surfaces is prevented.

A number of anaphylactic reactions have been recorded due to latex gloves. In these cases the exact cause of the reaction (latex, talc, corn powder) or agents facilitating an anaphylactic reaction (humidity) must be sought. In addition, suitable hypoallergic gloves or vinyl/nitrile gloves should be supplied. In case of an injury, scratch or exudative injury the use of a double pair of gloves is recommended for extra protection.

MASK AND GOGGLES

During the examination or any dental procedure likely to generate splashes of blood or other biological fluids, an appropriate mask and eye protectors are necessary. These masks must follow certain specifications in terms of size, thickness and material, excluding those designed for structural or technical occupations due to intense particle penetration ability.

Masks must be able to withhold at least 95% of the microorganisms. In case the dental patient suffers from an airborne disease (tuberculosis), the mask must be enhanced and fully adaptable to the wearer's face. Also, it must be able to withhold particles and microorganisms with a diameter up to 1 μ m., at a percentage of 95% (aspirator N95, FFP3). If the mask gets wet it must be immediately discarded and replaced.

Eye protectors may include various types of glasses, plastic masks or shields made of transparent materials and the side frame should be wide enough to adequately cover the eye.

These protectors must be rinsed with abundant water and get disinfected in case they get contaminated in between patients.

SUITABLE MEDICAL CLOTHING

Blouses may be reusable, made of a waterproof, non penetrable material, able to cover a great part of the dentist's body and arms.

They must be changed on a daily basis and definitely as soon as they get stained. If the operative procedure is expected to involve a large amount of bleeding or the patient is likely to be seropositive, it is highly recommended that specially designed single-use clothing be used. Reusable clothing must be washed in a machine washer at an appropriate temperature, using a detergent and always separately from domestic and non-medical clothing.

The personnel should not be allowed to go anywhere outside the dental practice wearing the clothing used in operations (canteens, cafeterias, offices).

SURFACE COVERINGS

Any surfaces, devices, electric switches, door handles, drawer knobs, taps, handles and device tubing which is not possible to sterilise or disinfect, should be meticulously covered with appropriate materials.

The materials recommended for that specific use are special rollers and plasticised paper sheets, cellulose film, aluminium foil, self-adhesive films, nylon cases, latex and vinyl cases etc. These protective coverings should be replaced after every contact and every patient.

CLEANING AND STERILISATION OF DENTAL INSTRUMENTS

Any dental hand instrument used during a dental work must undergo a cleaning and sterilisation procedure.

Immediately after the completion of a dental work (examination, restoration, surgery) the instruments must be discarded in a special plastic container filled with an appropriate disinfectant solution or enzyme solution with a proteolytic action.

After remaining within the solution for as long as the manufacturer recommends, the instruments are transferred to the machine washer where they undergo thorough mechanical cleaning using the appropriate detergents.

If dental materials (cements, pastes, oxides, etc) have been fixed to the instruments, the latter must be cleaned with ultrasonic devices and appropriate solutions.

Manual cleaning is not recommended as injuries are highly likely to be caused and because it is inferior to mechanical cleaning in terms of quality.

After the instruments have been cleaned, they are packaged in special bags or perforated cassettes and they are taken to the autoclaves to be sterilised.

Autoclaves are programmed to operate depending on the packaging of the instruments and according to the default specifications set by the manufacturer e.g. 134°C for 3 minutes or 121°C for 20 minutes or 121°C for 13 minutes etc. It should be noted that the aforementioned times DO NOT INCLUDE preheating of the autoclave or air removal.

The completion of the cycle and sterilisation process is confirmed through electronic instrument indications and changes in the colour or shape of the indicators.

SINGLE-USE INSTRUMENTS

These instruments are divided into two categories:

- a. Obligatory single-use instruments
- b. Optionally single-use instruments

Obligatory single-use instruments include anesthetic needles, scalpel blades, suture needles, saliva ejectors, dental cups, surgical suction nozzles, broaches, wedges, rubber cups, metallic bands, fluoride trays. These instruments can only be used once and be discarded afterwards.

Optionally single-use instruments include certain mirrors, metallic bands retainers, napkin holders, various types of burs, impression trays, material mixing pads, low speed handpieces for polishing after cleaning, high speed handpieces for cavity and stump formation in seropositive patients (Table p.18).

STERILISATION OF HANDPIECES AND BURRS

Low and high speed handpieces as well as various burs used in everyday clinical practice should be sterilized before use so that all conditions ensuring harmless dental care provided to all population groups are met.

Sterilizing the handpieces requires special attention and suitable preparation so that any damages to their interior are avoided and, consequently, defective operation and financial burden are prevented.

After the completion of any dental work, the external surfaces of the handpiece have come in contact with saliva, blood, dental tissue debris and residues of dental materials. However, it is likely that the internal tubes of the handpieces are also infected due to various hydrodynamic phenomena taking place on their tip when cavity or abutment formation are performed subgingivally.

When opening up a coronal cavity during endodontic therapy, forming stumps, polishing

gingival restorations or polishing the cervical areas of the teeth after a periodontal treatment the handpieces may be infected with various pathogens.

Several ways to control the spread of contaminating matter between two patients have been recommended. The most common methods of asepsis control are the following:

- Protection from any contact with the fluids existent in the oral environment
- Chemical disinfection
- Thermal sterilisation
- Disinfection using microwaves
- Disinfection via irrigation
- Single-use handpieces

Among the above techniques, moist heat using saturated water vapours (autoclave) offers the best results as regards the sterilization of handpieces in a very short time.

STERILISATION OF HANDPIECES

After the end of the dental work, the handpiece must operate for 5-10 seconds over the wash basin or a similar container while ejecting water and air. Then, after being detached from the tubes connecting it with the unit it must be meticulously washed and brushed under running water and dried with an absorbent paper.

The above process is absolutely necessary so that any biological or non biological contaminants are removed, since their presence has been proved to inhibit or limit any sterilisation technique. After external cleaning, the handpiece is reconnected to the tubes and operates for 3-5 seconds only with air so that any water residues are removed from the interior of the tubes and the impellers.

Then, the handpiece is lubricated with the lubricant recommended by the manufacturer and operates again for 10-20 seconds only with air so that the lubricant is properly distributed throughout the sensitive areas of the head.

After the end of this procedure, the handpiece along with the burr extractor are enclosed in a special pouch airtightly sealed either with a self-adhesive tape or a thermosealer.

The handpiece is placed in the autoclave where care should be taken for the pouches not

to be clambered so that the air passes unhampered.

The pouch with the handpiece must also include a sterilisation indicator which could be either a special tape or a vial with carbon grains. This is not necessary if the pouch includes a system controlling the length of stay and the vapour temperature within the autoclave.

Depending on the manufacturer's indications, the autoclave is programmed to operate at 121°C for 20 minutes or at 127°C for 13 minutes or at 134°C for 3 minutes. After the end of these cycles and after the indicators have confirmed that the conditions worked properly, the handpieces and the extractors are sterilised and ready to use.

Right before using them, some handpieces must be lubricated again with an appropriate lubricant which, this time, must be either sterilised or new and generally different from the one used to lubricate the septic handpiece before being placed in the autoclave.

STERILISATION OF BURRS

Burrs should be sterilized independently of their type or mouth area they have worked in. A necessary step prior to sterilizing a burr is meticulous cleaning from tooth tissue debris, residues of dental materials, blood clots or a paste-like mixture of all the above with saliva.

To clean burr shanks several methods have been suggested such as using a rubber, goldsmiths' brushes, old toothbrushes and many more which, however, are inadequate when blood clots or saliva paste coexist with tissue debris.

The most widely accepted cleaning method for burrs and other micro instruments are ultrasonic devices (baths) using suitable fluids and with the addition of enzymes with proteolytic action. In these baths using suitable fluids at a temperature of about 60°C, burrs vibrate at a frequency of 60-80 kHz for at least 15 minutes. After the end of this procedure, burrs are free from foreign matter as well as oxides very often being deposited on their stem.

After being removed from the ultrasonic bath, burrs must be dried using absorbent paper and hot air and placed in an appropriate device for sterilisation, depending on the material they are made of. More specifically, burrs made of common carbon steel should not be placed in the autoclave because they will undergo oxidation. Burrs made of stainless steel or tungsten carbide, on the other hand, are not significantly affected.

Dry heat ovens, ovens for chemical vapour sterilization and ethylene oxide ovens are suitable for sterilising all types of burrs. However, dry heat ovens may seriously damage the cutting edge of the burrs due to prolonged heating involved.

The use of various aldehydes and phenols can offer adequate sterilisation when used for at least 30 minutes and even chemical sterilisation when used for 10 hours. However, they may damage the integrity of rotating cutting instruments. It should be noted that no technique can fully remove organic debris and, therefore, result in successful sterilisation. For these reasons, single-use burrs intended to be discarded after each patient have recently been introduced.

USE AND CARE OF SHARP INSTRUMENTS AND NEEDLES

Sharp instruments (needles, scalpels, reamers etc.) having come into contact with blood and saliva must be considered infectious and used with special care so that injuries are avoided.

Under no circumstances should used needles be recapped either with both hands or using any other technique when the point of the needle is directed towards any part of the body.

The use of one hand to recap the needle or a mechanic device designed to hold the needle cap are techniques strongly recommended. The use of needle destroyers which melt the metallic tip of the instrument has recently been introduced.

Compliance with the infection control measures is the safest way of protection against the occupational risk of infection by HIV and other microorganisms. These measures must be taken by all dentists, for every dental patient and in every dental work.

PACKAGING AND DISPOSAL OF WASTE

Dental practices, as any healthcare provision facilities, produce large volumes of waste which can be categorised as follows:

- a. Non-hazardous domestic waste (packages of food, soft drinks, materials, instruments, individual parts)
- b. Potentially hazardous waste (napkins, surface coverings, material packages, incinerators)

- c. Hazardous waste (single-use surgical drapes, coverings for surfaces, instruments, devices and individual parts, saliva ejectors, surgical suction, single-use instruments, interdental thread, cotton swabs, gauzes, matrix bands, anaesthetic ampules, clothing, masks, gloves, coverings and cellulose matrix bands, teeth and periodontal tissues, fluoride trays and other items) the dentist comes in contact with.
- d. Sharp items and instruments (anaesthesia and irrigation needles, scalpels, suture needles, wedges, foils, metallic rings, metallic coverings, burs, reamers, files, root tip picks).

Only the waste falling into the first category is allowed to be packaged in a conventional way. As regards the rest, both packaging and disposal must be done in accordance with certain rules.

Category b, c and d waste must be discarded in plastic or metal containers lined with a high quality, thick, plastic bag, preferably of a clearly visible colour (yellow or red).

When discarding such items hands must be protected with single-use or household gloves. Also, pressing against the waste bag using either a hand or a foot should be avoided. Afterwards, when the waste container gets full, not to the top though, the bag must be carefully removed, tightly closed and placed within a second one of the same colour bearing an indication that it contains hazardous waste (OSHA and EPA Regulation).

Sharp or other items likely to cause injuries must be placed in special containers made of a strong, high quality plastic or carton with a clearly visible colour and an indication that dangerous instruments are contained.

A number of these containers are able to detach the needle from the syringe or the blade from the scalpel handle while others cut off the sharp part of them. Also, they have been designed in such a way that it is not possible to be opened while the slot the sharps are dropped into is so small that access to their content is impossible.

These containers are tightly closed when full and it is recommended that they are incinerated. If this not possible, they should be irrigated with an appropriate detergent and placed with the rest waste but wrapped in a separate bag.

As regards the storing of sharps, except for the special storage boxes, the use of a special freezer is recommended. In addition, they should be packaged in appropriate cardboard boxes placed in special bags. At this point the infectious materials are ready to be collected by the special dustcart.

The fluids contained in various devices (model disinfectants, ultrasonic fluids, surgical suction fluids, disinfection fluids for surfaces and floors) must be discarded in the drainage through a special funnel and not in the sinks, toilets or any personal hygiene facilities used by the personnel or the patients. The discharge funnel must afterwards be disinfected with an appropriate solution.

INSTRUCTIONS FOR PROTECTION MEASURES IN ENDODONTIC PATIENTS

A) BEFORE THE SESSION

- 1) General principles of history taking, instrument reception, tablet arrangement and asepsy-antisepsis preventive measures.
- 2) The devices used for electric pulp testing must be able to operate without prior removal of Latex gloves or else they must include the necessary equipment (lip ground wire).
- 3) During electric pulp testing it is recommended that transparent gloves are used on top of the Latex ones.

B) DURING THE SESSION

- 1) Use of appropriate irrigation solution, such as sodium hypochlorite 3% or Chlorhexidine digluconate 0.5-2% solution prepared on a daily basis, as no such product is commercially available.
- 2) The total quantity required per session must be collected in a plastic vial before the session. The irrigation syringe must be filled from this vial.
- 3) Any quantity of irrigation solution stored should be kept in a clean and dry container and the expiry date must be regularly checked.
- 4) Most files, paper points and gutta percha points are supplied in non-sterilised packages. All used microinstruments (files) must be sterilized in the autoclave prior to use and, if possible, they should be used for a small number of patients or be single-use. After being removed from the root canal, micro-instruments are cleaned with a gauze impregnated with a Labarague solution prior to reuse. The same cleaning procedure must be followed before they are forwarded to the septic instruments area.
- 5) Salt microsterilizers do not provide effective sterilization of microinstruments. They can only be used for paper points or in cases of urgent recontamination of

- instruments which are going to be used on the same patient using a rubber dam.
- 6) Gutta percha points are disinfected using an appropriate antiseptic solution. In case a point has been tested on another patient earlier it must be immediately discarded.
 - 7) Single-use mixing pads to make a Grossman paste, zinc phosphate cement or any other paste.
 - 8) Single-use Luer syringe for irrigation which is going to be discarded after the end of the session.
 - 9) Use of a plastic covering for dental intraoral films.
 - 10) Single-use transparent examination gloves on top of the Latex gloves while taking an X-ray (Initial, Intermediate, Final). After taking the X-ray, the plastic covering of the film opens and the film is released on a clean spot where it is collected by the head scrub nurse so that the procedure of development begins.
 - 11) R-C-Prep material is provided by the scrub nurse on a single-use mixing pad.
 - 12) Any material removal from the instrument stand should be done in a way that does not cause recontamination of the material or the stand. Also, if there is not an assistant, transparent examination gloves should be used on top of the Latex ones.

C) AFTER THE END OF THE SESSION

- 1) If a dam has been used, the rubber part must be discarded after the end of the session.
- 2) All worn out micro-instruments and used needles must be discarded in sharps containers.
- 3) All used endodontic instruments should be placed in ultrasonic baths where, using appropriate fluids and proteolytic enzymes, any blood debris, smear layer and, most importantly, prion proteins will be removed. Then, they will be forwarded to sterilization. All micro-instruments used to remove pulp (broaches) are intended exclusively for single use. In cases of patients with a diagnosed blood-borne disease all micro-instruments must be discarded after use.

Micro-instruments (in case of recontamination during the session, to be used on the same patient)	Salt sterilizer
Paper points	Salt sterilizer
Guttapercha points	Sodium hypochlorite 3% or Chlorhexidine digluconate 2% solution

ENDODONTICS LABORATORY

In the endodontics laboratory, used teeth must always be embedded into plaster blocks, not free.

Any micro-instruments used to process the root canal must be used with special care and in a way that the point of the used instrument is not directed towards any part of the student's body (e.g. fingers).

PREPARING IMPRESSIONS FOR THE LAB

After removing the tray from the oral cavity, all impressions must be cleaned and sterilised in an appropriate way and using suitable solutions. More specifically, after recording the impression, the tray must be transferred to the wash basin where the flow of tap water will remove any visible organic contaminants (blood, saliva etc.). Afterwards, the tray is sprayed with or immersed in a suitable disinfectant solution depending on the properties of the impression material used. Impressions must be packaged in a suitable plastic box or a pet bag so that they can be safely transported to the dental laboratory.

HANDLING OF BIOPSY SPECIMENS

- To protect the personnel handling and transporting biopsy specimens submitted to the Oral Pathology Laboratory, the **Infection Control and Waste Management Working Group** of the National and Kapodistrian University of Athens, Greece, recommends the following:
 - Place the biopsy specimen in 10% neutral buffered formalin contained in a sturdy, leak proof, rigid plastic container with a secure lid to prevent leakage during transport and labeled with the patient's name.
 - Care should be taken when collecting the specimen to avoid contamination of the outside of the container as well as of the laboratory form accompanying the biopsy specimen.
 - If a biopsy container becomes visibly contaminated:
 - Replace it or clean and disinfect the outside of the container to remove external contamination. Alternatively, place the container in an impervious bag labeled with the biohazard symbol.

- Gloves, surgical masks and protective eyewear should be worn when handling pathology specimens during routine laboratory procedures (e.g. grossing).
- According to the «Hazardous material transportation regulations», as designated by the Greek Ministry of Health (28/01/2013, Αρ. Πρωτ. Υ1ΓΠ. οικ.10946), diagnostic specimens are assigned to **UN 3373 «Biological substance, Category B»**. Shipment of diagnostic specimens for transport by surface (railway, by road) should meet the applicable standards in P650 postal packaging as follows:
 - Any packaging for biological substances must include three components: **a)** a primary, leak proof, rigid plastic container that is in direct contact with the specimen, **b)** a secondary packaging that fully encapsulates the primary receptacle and **c)** an outer packaging for shipping or transit.
 - For liquids, absorbent material sufficient to absorb the entire contents of all primary receptacles must be placed between the primary receptacles and the secondary packaging.
 - Multiple primary receptacles in the same secondary packaging must be separated to prevent contact between them.
 - One external surface of the outer packaging clearly must show the text **“BIOLOGICAL SUBSTANCE, CATEGORY B.”** Adjacent to this, inside a diamond mark whose lines are at least 2 mm thick, must appear the text **“UN 3373”** in characters at least 6 mm high.

PROTECTION MEASURES PRIOR TO BEGINNING DENTAL WORK

The dental personnel must do the following before performing any dental procedure:

- Get vaccinated against hepatitis B. The vaccination is provided to students and dental personnel for free and it is very effective.
- Take a detailed medical history. This is necessary to find out if the patient has been through some kind of active contamination or other diseases indicating immunosuppression or other systemic illnesses. Independently of the information you have collected from your patient, you must consider him/her **potentially contaminated and take the precautions advised for all patients.**

- Make sure all the instruments are sterilised. Any surgical instruments used to penetrate soft tissues or bones, such as tweezers, chisels, scalers, curettes, must be sterilised after use.
- Protect working surfaces. Cover all machine handles (projector, x-ray machine head or any other surface likely to be contaminated during patient treatment) with protective covers made of plastic or aluminum. If traces of blood or other fluids by the previous patient are detected, disinfect the surface with an appropriate detergent and then cover the surface with an appropriate material.
- Make sure they have at their disposal all the disinfectant fluids and waste containers necessary.

PROTECTION MEASURES AFTER COMPLETING DENTAL WORK

- Before you clean the working surfaces, wear thick work gloves so that your hands are covered and not exposed to blood or other biological fluids left on surfaces or instruments. Remove any protective cover. If the cover has been stained with blood, place it in a red bag. If the blood is completely dry or the cover has not been contaminated, place it in a regular bag. Use absorbent paper in case blood has penetrated the protective cover and put the absorbent paper in the red bag. Use an appropriate disinfectant.
- Clean and sterilise all the instruments and disinfect the working surfaces with an appropriate disinfectant solution (phenolic, alcoholic, quaternary ammonium compounds).
- Sterilise in the autoclave or dry heat oven any instruments having been in close contact with tissues. A special tape indicating that they have been sterilised must be attached on the instruments so that one is sure that sterilisation has been carried out. This procedure is performed by specialised personnel.
- All handpieces must be sterilised in between patients. Follow the instructions recommended by the manufacturers. Chemical sterilisation is not safe. Ultrasonic handpieces, curettes and air syringes must be washed and sterilised. This procedure is performed by specialised personnel.
- Place and remove any used waste. Place all surgical blades and needles in a solid, plastic sharps container. Do not recap, bend or destroy the needles before discarding them. Do not fill the plastic container to the top, make sure you have

closed it firmly and then dispose of it. All red or yellow plastic bags must be collected on a daily basis to prevent the spread of infectious diseases.

- Clean and disinfect the impressions. Any impression or other recording should not be sent to the lab before being cleaned or disinfected.
- Remove your gloves and wash your hands with a disinfectant and water. If more patients are waiting to be examined, place back the protective covers and repeat the procedure.

WHAT MUST BE DONE IN CASE OF AN ACCIDENT AND EXPOSURE TO INFECTED MATERIAL

Although the probability of HIV transmission after accidental exposure lies below 0.5%, it is imperative that protective measures be taken. In case of occupational exposure to HIV, after an injury from a contaminated needle or other sharp instrument used on a patient with a diagnosed HIV infection, the following actions must be taken:

- Prompt and meticulous washing of the injured area.
- Placing of a gauze with an antiseptic agent on the injury (e.g. Cidex, formadelhyde, povidone iodine or 75% alcohol etc.) for at least 15 minutes.
- The patient must be examined as soon as possible. In case of an HIV infection the virus can be detected in antigen presenting cells and peripheral ganglia within 72 hours after the infection while viraemia develops in about five days. The latter allows a 72-hour-period within which treatment can be provided.
- Chemoprophylaxis with antiretroviral drugs must begin as soon as possible after the incident. After 72 hours have passed there is no point in providing chemoprophylaxis.

POST EXPOSURE PROPHYLAXIS, PEP

- Depending on the size of the injury and the viral load of the patient two or three antiretroviral drugs are used (two nucleosides with the addition or not of a protease inhibitor). These same drugs are used to treat HIV infected people.

- Chemoprophylaxis with antiretroviral drugs lasts for four weeks and has a 80% chance of success in preventing seroconversion.

SINGLE -USE ITEMS

Anesthesia needles	Swabs for binding agents	Rubber polishing cups	Patient examination kits
Suture needles	Wood interdental wedges	Polishing brushes	Carpule syringes
Suture stitches	Plastic interdental wedges	Broaches	Napkin holders
Scalpel blades	Irrigation syringes	Swabs and gauzes in general	Complete suture kit
Scalpels with handles	Irrigation needles	Various impression trays for special uses	Air syringe anterior tips
Saliva ejectors (tips)	Patient cups	Impression material mixers	X-ray film coverings
Plastic suction (nozzles)	Shipping boxes for prosthetic restorations	Dental material mixing pads	Coverings for intraoral devices
Patient towels	Metallic matrix bands	Surgical drapes	Orthodontic brackets, wires, rings, elastics
Plastic materials for surface covering	Cellulose matrix bands	Surgical clothing sterilized or not	Rubber dam
Amalgam capsules	Brushes for application of polymers	Coverings/ Reconstitution models	Fluoride trays

TABLE 1

Characteristics of sterilization methods

Sterilisation method	Advantages	Disadvantages	Sterilisation conditions*
Moist heat autoclave	<ul style="list-style-type: none"> • Short sterilisation cycle, good steam penetration • Effective method for most instruments 	<ul style="list-style-type: none"> • Carbon steel instruments undergo corrosion • Dulling of unprotected cutting edges • Packages may not be dry at the end of sterilisation • Heat sensitive plastics are destroyed 	Temperature 121°C-134°C Time 15-20' at a pressure of 15 p.s.i. or 3-7' at a pressure of 30 p.s.i. Newest autoclaves offer programmes with various sterilisation times and pressure values.

Notes: Variations in time relate to whether the instruments are wrapped or not. The presence of air and excess water within the autoclave reduce its effectiveness. Steam must be allowed to go through the instruments.

Placement of instruments in the autoclave: The instruments can be wrapped with a special paper, plastic or surgical muslin or placed in perforated containers **but not** in airtight metal or glass containers.

Sterilisation method	Advantages	Disadvantages	Sterilisation conditions*
Dry heat	<ul style="list-style-type: none"> • It does not cause corrosion • It does not dull the cutting edge of the instruments • Effective method for most instruments and mirrors 	<ul style="list-style-type: none"> • Long sterilisation cycle • Not good hot dry air penetration • Destroys most plastic and rubber items • It may discolour certain materials (e.g. paper etc.) 	Temperature 160°C-170°C autoclave Time 1 hour

Notes: In some instruments welding is destroyed after repeated sterilization cycles at 170°C. Dry heat autoclaves with a fan for better heat circulation are available.

Placement of instruments in the autoclave: The instruments are wrapped in paper bags, muslin, aluminum foil, aluminum discs or special plastic bags.

IT IS IMPERATIVE THAT STUDENTS, SCRUB NURSES AND MEMBERS OF THE TEACHING STAFF BE IMMUNISED AGAINST HEPATITIS B VIRUS AND ANTIBODY TITRES BE REGULARLY MEASURED

TABLE 2

Strength of dental instruments' and items' materials
to sterilisation in moist and dry heat autoclaves

Materials	Autoclave vapours+	Dry heat autoclave
• Stainless steel	Yes	Yes
• Carbide steel	Yes	Yes*
• Carbon steel or plain steel	No	Yes**
• Brass (usually in internal parts)	Yes	Yes
• Copper	Yes	Yes*
• Amalgam	No	No
• Silicone elastic	Yes	Yes
• LATEX elastic	Yes	No
• Heat sensitive at high temperatures plastics (TEFLON)	Yes*	Yes
• Heat sensitive at low temperatures plastics (NYLON)	Yes	No
• Heatsensitive at low temperatures plastics	No	No
• Cotton items	Yes*	Yes
• Oil	No	No
• Acquatic solutions	Yes	No

+ Chemical protection of the instrument is required so that corrosion is avoided.

* Preferable method

** The materials must be completely dry before sterilisation so that corrosion and
oxidisation are prevented.

**THE USE OF LATEX GLOVES WHILE STUDENTS ARE WORKING
ON DENTAL TISSUES IN THE LAB IS IMPERATIVE**

TABLE 3

Selection of a sterilisation method for instruments used in the clinic of A Section (Orthodontics, Paediatric Dentistry, Preventive Dentistry)

Instruments	Autoclave vapours+	Dry heat autoclave
General hand instruments		
Stainless steel	Yes	Yes
Carbon steel	No	Yes
Mirrors	Yes	Yes*
Burrs		
Stainless steel	Yes	Yes*
Carbon steel	No	Yes
Tungsten Carbide	Yes	Yes*
Stones		
Diamond stones	Yes	Yes*
Polishing	Yes*	Yes
Rubber items		
Rubber polishing cups	No	(single-use) No
Impression trays		
Aluminum	Yes*	Yes
Chromium metal	Yes	Yes
Individual acrylic trays	No	No
Plastics		
a. Heat sensitive plastic	Yes	No
b. Non-heat sensitive plastic	No	(single-use) No
Orthodontic pliers		
High quality, stainless	Yes	Yes
Low quality, stainless	No	Yes
With plastic parts	No	Yes
X-ray equipment		
Plastic intraoral X-ray retainer	Yes§	No
Handpieces		
Sterilisable#	Yes	No
Non-sterilisable	No	No
Prophylaxis angle#§	Yes	Yes
Endodontic instruments and items		
see Table 4		

+ Chemical protection of the instruments is required prior to sterilization so that corrosion is prevented.

* preferable method

Manufacturers use a variety of alloys and materials for these items (products). As regards handpieces and their attachments as well as ultrasonic scalers, it is recommended that manufacturers are contacted prior to sterilization.

§ Effective method which, however, involves high risk of damaging the instrument.

TABLE 4

Selection of a sterilisation method for instruments used
in the clinic of B Section (Endodontics, Dental Surgery, Periodontics)

Instruments	Autoclave vapours+	Dry heat autoclave
General hand instruments		
Stainless steel	Yes	Yes
Carbon steel	No	Yes
Mirrors	Yes	Yes*
Burrs		
Stainless steel	Yes	Yes*
Carbon steel	No	Yes
Tungsten Carbide	Yes	Yes*
Stones		
Diamond stones	Yes	Yes*
Polishing	Yes*	Yes
Grinding	Yes	Yes
Rubber items		
Rubber polishing cups	No (single-use)	No
Surgical instruments		
Stainless steel	Yes	Yes
Ultrasonic scalers	Yes	No
Endodontic instruments and items (Reamers, files, root tip picks)		
Stainless with handles made of stainless steel	Yes	Yes
Non-stainless with metallic handles	No	Yes
Stainless with plastic handles	Yes	No
Lateral and vertical condensation	Yes	Yes
Glass plates++	Yes	Yes
Glass wide-mouth cups	Yes*	Yes
Rubber dam equipment		
Carbon steel or tungsten steel clamps	No	Yes
Stainless steel clamps	Yes	Yes
Drills	No	Yes
Plastic frames	No	No
Metallic frames	Yes	Yes
Handpieces		
Sterilisable [#]	Yes	No
Non-sterilisable	No	No
Prophylaxis angle [§]	Yes	Yes

- + Chemical protection of the instruments is required prior to sterilization so that corrosion is prevented.
- * preferable method
- # Manufacturers use a variety of alloys and materials for these items (products). As regards handpieces and their attachments as well as ultrasonic scalers, it is recommended that manufacturers are contacted prior to sterilization.
- § Effective method which, however, involves high risk of damaging the instrument.
- ++ They may be replaced by single-use paper.

TABLE 5

Selection of a sterilisation method for instruments used
in the clinic of C Section (Fixed - Removable Prosthodontics)

Instruments	Autoclave vapours+	Dry heat autoclave
General hand instruments		
Stainless steel	Yes	Yes
Carbon steel	No	Yes
Mirrors	Yes	Yes*
Burrs		
Steel	Yes	Yes*
Carbon steel	No	Yes
Tungsten Carbide	Yes	Yes*
Stones		
Diamond stones	Yes	Yes*
Polishing		
Grinding	Yes*	Yes
Impression trays		
Aluminum	Yes*	Yes
Chromium metal	Yes	Yes
Individual acrylic trays	No (single-use)	No
Plastic	No (single-use)	No
Drills and polishing discs		
Elastic	Yes	No
Stones	No	No
Fabric discs	Yes	No
Handpieces		
Sterilisable#	Yes	No
Non-sterilisable	No	No

+ Chemical protection of the instruments is required prior to sterilization so that corrosion is prevented.

* preferable method

Manufacturers use a variety of alloys and materials for these items (products). As regards handpieces and their attachments as well as ultrasonic scalers, it is recommended that manufacturers are contacted prior to sterilization.

TABLE 6

Selection of a sterilisation method for instruments used
in the clinic of D Section (Oral Surgery – Maxillofacial Surgery –
Oral Pathology)

Instruments	Autoclave vapours+	Dry heat autoclave
General hand instruments		
Stainless steel	Yes	Yes
Carbon steel	No	Yes
Mirrors	Yes	Yes*
Burrs		
Steel	Yes	Yes*
Carbon steel	No	Yes
Tungsten Carbide	Yes	Yes*
Surgical instruments		
Stainless steel	Yes	Yes
Electrosurgical blades and handles	No	No
Nitrous oxide anaesthesia equipment		
Mask	Yes*	No
Supplies (tubes)	Yes*	No
X-ray equipment		
Plastic intraoral X-ray retainer	Yes§	No
Handpieces		
Sterilisable#	Yes	No
Non-sterilisable	No	No

+ Chemical protection of the instruments is required prior to sterilization so that corrosion is prevented.

* preferable method

Manufacturers use a variety of alloys and materials for these items (products). As regards handpieces and their attachments as well as ultrasonic scalers, it is recommended that manufacturers are contacted prior to sterilization.

§ Effective method which, however, involves high risk of damaging the instrument.

Note: In case the preferable disinfection method is not indicated on the packaging, the above table should be advised.

* After their short immersion time (1 minute) alginates and poyethers are wrapped in a gauze embedded in the disinfectant for 10 minutes.

** Polysulfides and silicones are some of the most stable materials, with the exception of neutral glutaraldehyde, as regards the effects of disinfectants. Quite recently it has been suggested that glutaraldehyde could be replaced by OPA (Ortho-Phthalaldehyde).

TABLE 7
Impression disinfection

Impression material	Disinfectant	Immersion time
Alginates*	Sodium hypochlorite 1:101 minute Iodophors 1:213	1 minute
Polyethers*	Sodium hypochlorite 1:10	
Polysulfides and silicones (addition – condensation)**	Glutaraldehyde (alkaline-acid-neutral) Glutaraldehyde+phenol Iodophors Chlorine products Phenolic complexes	10 minutes
Reversible hydrocolloids	Iodophors 1:213 Sodium hypochlorite 1:10	10 minutes
Zinc oxide-eugenol	Iodophors 1:213	10 minutes

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REFERENCE CENTRE FOR AIDS AND SEXUALLY TRANSMITTED DISEASES 'EVANGELISMOS' GENERAL HOSPITAL

Ipsilantou 45-47, 106 76 Athens, tel. 213 20.45.701, 213 20.43.160

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