INFECTION CONTROL PROTOCOLS IN PROSTHETIC DENTISTRY

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ABSTRACT

Dental professionals are exposed to a wide range of potential pathogens and have high chances of infection transmission not only in the clinic, but also in the laboratory. The use of effective infection control procedures and universal precautions in the dental office and the dental laboratory will prevent cross contamination that could extend to dentists, dental office staff, dental technicians and patients. Prosthodontics is a branch in dentistry which includes manipulation of various materials, equipment, their use and instrumentation for rehabilitation of patients. Patients in the geriatric group are of special importance in this branch. A strict protocol for infection control is mandatory to combat any kind of transmission and cross-contamination between the dental office personnel and patient and vice-versa. This review of literature has attempted to discuss the various modalities of sterilization and disinfection followed from a prosthodontist’s point of view, in the clinic and the laboratory also.

I. INTRODUCTION

The goal of infection control is to prevent the spread of infection from one patient to another and to the treating healthcare worker. Prevention of cross infection is the most important aspect of infection control and measures to achieve the same need to be practical and economical.

Published guidelines for infection control include the use of chemical sterilants and disinfectants when it is not possible to heat sterilize or dispose of items that become contaminated during treatment. In addition numerous environmental surfaces routinely become contaminated with saliva, blood and exudates and require surface cleaning and disinfection (or placement of disposable covers).

Disinfection: It means killing or removal of organisms capable of causing infection, disinfection does not necessarily include sterilization although some processes of disinfection accomplish sterilization. Disinfection is usually accomplished by chemicals. Disinfection is generally thought of as killing the more sensitive negative cells but not heat resistance spores.

Sterilization: It means the freeing of any object or substance from all life of any kind. For microbiological purposes microorganisms may be killed in situ by heat, gases such as formaldehyde, ethylene gas or beta propiolactone, solutions of various chemicals, ultraviolet or gamma irradiation.

A disinfectant is an agent accomplishing disinfection. The term is often used synonymously with antiseptic. However one ordinarily thinks of disinfection and disinfectants as applicable mainly to inanimate objects.
Antiseptic: They are generally considered to be substances that kill or inhibit microorganisms, especially in contact with the body without causing extensive damage to the flesh.

Bactericide: Any substance or agent that kills bacteria is a bactericide or bacterial agent (cide-killer).

Bacteriostatic agents: They have the property inhibiting bacterial multiplication. Multiplication resumes upon removal of the agent.

Asepsis (absence of sepsis): It is the absence of infectious microorganisms in living tissue. The term is usually applied to any technique designed to keep all unwanted microorganisms out of any field.

Chemical germicides manufactured for immersion sterilization or environmental surface disinfection are regulated and registered primarily by the environmental protection agency (EPA).

A standard system of classification for disinfectants was proposed by Spaulding in 1972. This system was developed originally for classifying hospital instruments according to their use and degree of contamination but also can be adapted to include dental instrument and equipment. A modification of Spaulding’s original scheme was published in 1991.

Different classes of disinfectants are defined based on their efficiency against vegetative bacteria, tubercle bacilli, fungal spores, lipid and non-lipid containing viruses and bacterial endospores. High level disinfectants are analogous to EPA-registered sporicides because they are capable of inactivating resistant bacterial spores and all other microbial forms. The ability to kill bacterial spores is an essential criterion for inclusion of a chemical into the sterilant and high level disinfectant class.

Examples: Ethylene oxide gas and immersion glutaraldehyde solutions.

Intermediate level disinfectants:

They may not inactivate bacterial endospores but do kill other microbial forms, especially tubercle bacilli.

Examples: Formaldehyde, chlorine compounds, iodophors, alcohols and many phenolic disinfectants.

Low level disinfectants:

They are chemical agents with narrowest antibacterial range.

Examples: Simple quaternary compounds, simple phenolics and detergents.

They are suitable for cleaning environmental surfaces in a treatment area but are unacceptable for any other use in dentistry.

II. CHEMICAL DISINFECTANTS:

Detergent (Surface active substances)

Detergents are preparations that alter the nature of interfaces to lower surface tension and increase cleaning. The antimicrobial effect occur primarily on the cell membrane by alteration of the osmotic barrier. This results in increased cell permeability and target cells consequently cannot maintain their integrity. Common surface active agents are classified as nonionic, anionic or cationic.

Nonionic chemicals do not possess any antimicrobial properties. Synthetic anionic detergents and soaps are examples of anionic preparations. Soaps are salts of long chain aliphatic carboxylic acids of animal and plant fats. Most synthetic anionic detergents contain alkyl and / or acryl sulfates or sulfonates. The alkalic content and sodium salt allow soaps to kill streptococci, treponomas, pneumococci, gonococci and influenza viruses. These effects not withstanding the primary value of anionic detergents appears to be in their mechanical cleansing action.

Quaternary ammonium preparations are examples of cationic surface active disinfectants. These agents are germicidal in much lower concentration than non-ionic detergents and can remain bacteriostatic in relatively high dilutions.
Advantages:
1. EPA registered.
2. Bactericidal against gram positive bacteria.
3. Pleasant odour.
4. Low tissue toxicity.

Disadvantages:
1. Not tuberculocidal, sporicidal or virucidal against hydrophilic viruses.
2. Inactivated by anionic detergents (i.e. soaps and hard water).
3. Inactivated by organic matter.
4. Evidence suggesting variable activity against gram-negative bacteria.

Alcohols:
They have a fairly broad antimicrobial spectrum. Extensively used alcohols are ethyl alcohol and isopropyl alcohol. Both these agents are effective protein denaturants and lipid solvents.

Ethyl alcohol: It is relatively nontoxic, colourless, nearly odourless and tasteless and readily evaporates without residue.

Isopropyl alcohol: It is less corrosive than ethyl alcohol because it is not oxidized as rapidly to acetic acid and acetaldehyde. They are not recommended for use as environmental surface disinfectants because of the inherent problems. They are not effective in the presence of tissue proteins glycoproteins such as those found in saliva and blood. Alcohols historically have been shown to be poor cleaning agents in the presence of bioburden. Exposure to alcohol denaturates and dehydrates proteins, making them insoluble and tenaciously adherent to moist surfaces. A coating of denaturated bioburden can protect contaminant microorganisms from the destructive effects of alcohol for prolonged intervals. Rapid evaporation from treated environmental surfaces also limits alcohol activity on protein coated bacteria and viruses which are found commonly in the spatter generated during dental procedures. Other problems include corrosiveness of alcohols on metal surface and destruction of certain materials (i.e. plastics and vinyl coverings).

Advantages:
1. Rapidly bactericidal.
2. Tuberculocidal and virucidal (lipophilic viruses only).
3. Benefits from positive historic perception.
4. Economical.

Disadvantages:
1. Not sporicidal.
2. Diminished activity with bioburden.
3. Damaging to certain materials including rubber and plastics.
4. Rapid evaporation rate with diminished activity against viruses in dried blood, saliva and other secretions on surfaces.
5. Not recommended for environmental surface disinfection.

Iodine and Iodophors:
The high reactivity of this halogen with its target substrate gives it potent germicidal effects. It acts by iodination of proteins and subsequent formation of protein salts. Because iodine is insoluble in water, it has been prepared routinely as a tincture with iodide salt being dissolved in alcohol.

**Drawbacks of iodine:**
Irritating and allergenic, corrodes metals and stains skin and clothing. The later formulations in the form of dissociable complexes reduce the caustic and staining effects. These compounds are called iodophors.

Iodophor antiseptics are useful in preparing the oral mucosa for local anaesthesia and surgical procedures. In addition to remaining microbial populations from the skin in large numbers, these cleansers are not rinsed off completely and hence a residual antimicrobial effect may remain in the scrubbed areas to provide prolonged epithelial antiseptics.

**Disinfectant characteristics:**

**Advantages:**
1. EPA registered intermediate level surface disinfectant.
2. Broad spectrum, bactericidal, tuberculocidal and virucidal against hydrophilic and lipophilic viruses.
3. Biocidal activity with 3-10 minutes.
4. Effective in dilute solution.
5. Surfactant carrier that maintains surface moistness.
6. Residual biocidal action.

**Disadvantages:**
1. Unstable at high temperatures.
2. Dilution and contact time critical.
3. Daily preparation necessary.
4. Discoloration of some surfaces.
6. Inactivated by hard water (1:2000)

**Chlorine containing agents:**
The halogen chlorine acts against microbial forms by oxidation, as hypochlorous acid in which it is converted quickly by water. Elemental chlorine is a potent germicide killing most bacteria concentrations (0.10 to 0.25ppm). Accepted chlorine containing compounds in common use are sodium hypochlorite solutions and chlorine oxide preparations.

**Advantages of hypochlorites:**
1. EPA registered.
2. Rapid antimicrobial action.
3. Broad spectrum, bactericidal, tuberculocidal and virucidal (also sporicidal under certain conditions).
4. Effective in dilute solution.
5. Economical.

**Disadvantages:**
1. Chemically unstable solution.
2. Necessary to prepare fresh diluted solutions.
4. Unpleasant persistent odor in high concentrations.
5. Irritating to skin and eyes.
6. Corrosive to metals.
7. Damaging to clotting.
8. Degradation of plastic or rubber.

**Chlorine dioxide:**

*Advantages:*
1. Instrument or environmental surfaces germicide.
2. Rapid acting-3 minutes for disinfection.

*Disadvantages:*
1. Has to be discarded daily.
2. Inability to readily penetrate organic debris.
3. Protective eye wear / gloves required.
4. Closed containers.
5. Adequate ventilation necessary for surface disinfection.
6. Corrosive to aluminium containers.

**III. PHENOLS AND DERIVATIVES**

These agents act as cytoplasmic poisons by penetrating and disrupting microbial cell walls, leading to denaturation of intracellular proteins. The intense penetration capability of phenols is probably the major factor associated with their antimicrobial activity.

**Complex synthetic phenols:**

In mid 1980’s a new class of phenolic compounds was approved by the EPA as tuberculocidal surface disinfectants. These contain more than one phenolic agent.

**Synthetic phenols:**

*Advantages:*
1. EPA registered surface disinfectant.
2. Broad antimicrobial spectrum.
3. Tuberculocidal.
4. Useful on metal, glass, rubber and plastic.
5. Residual biocidal action.

*Disadvantages:*
1. Not sporicidal.
2. Fresh solutions have to be prepared daily.
3. Degrades plastics and etches glass on prolonged exposure.
4. Difficult to rinse off on certain materials.
5. Film accumulation.
6. Skin and eye irritation.

Rationale for practical infection control in prosthetic dentistry:
Routine dental care professionals are at an increased risk of cross infection while treating patients. This occupational potential for disease transmission becomes evident initially when one realizes that most human microbial pathogens have been isolated from oral secretions. Because of repeated exposure to the microorganisms present in blood and saliva, the incidence of certain infectious diseases has been significantly higher among dental professionals than observed for the general population. Hepatitis B, tuberculosis and herpes simplex virus infections are well recognized and indicate the need for increased understanding of modes of disease transmission and infection control procedures by dental care providers.

The general routes for transmission of microbial agents in dental medicine are as follows:
1. Direct contact with infectious lesions or infected saliva or blood.
2. Indirect transmission via transfer of microorganisms from a contaminated intermediate object.
3. Splatter of blood, saliva / nasopharyngeal secretions directly into broken or intact skin or mucosa.
4. Airosolization, the airborne transfer of microorganisms.

Part of the problem lies in the fact that many practitioners and auxiliaries previously failed to comprehend or appreciate the infection potential presented by saliva and blood during treatment. The risk of potential infection was dismissed because of the splatter coming from the patients mouth is not noticed readily. Organic debris may be transparent or translucent and dries as a clear film on skin, clothing and other surfaces.

Pretreatment considerations:
When the dental operatory is being prepared for treatment at the beginning of the day, the waterlines should be flushed for several minutes to remove bacterial growth that may have accumulated overnight. The equipments should be disinfected. A hospital level tuberculocidal disinfectant that is registered with the environmental protection agency should be used on hard surfaces in the dental office.

Disinfection of impressions:
Personal protective equipment: Protective eye wear, masks and gloves when handling a contaminated impression until it has been disinfected.

Rinse the impression: Immediately after an impression is taken in the dental operatory, rinse it under running water in order to remove any saliva or blood. This step in essential for allowing optimum disinfection of the impression.

Dental impressions:
Dental impressions were one of the first laboratory items to be considered contaminated and a potential infection control problem. The first extensive study on disinfection of impressions was not published until 1981. (Sloter and McCabe, 1981). Traditionally impressions were rinsed under running water after being removed from the mouth to visibly eliminate saliva and blood. Although rinsing significantly reduces the numbers of microorganisms in most cases, it does not decontaminate the impression however rinsing before and after disinfection still should be done as part of the protocol. In 1991, the ADA council on dental materials, instruments and equipment recommended that all dental impressions be disinfected by immersion.

The time for exposure to a particular disinfectant (i.e. the immersion time) should be at least that recommended by the product manufacturer for tuberculocidal disinfection. The 1991 ADA council recommendation suggests use of disinfectants requiring no more than 30 minutes for disinfection. Impression materials that are hydrophilic should be disinfected with a product requiring a minimum time for disinfection (preferably no more than 10 minutes). Caution should be exercised when following recommendations for disinfection of a particular
impression material. Some manufacturers have recommended disinfectant exposure times that are inconsistent with the recommendations of the disinfectant manufacturers for disinfecting the impressions.

Roy Storer, John F. McCabe (1981) evaluated the effect of sterilizing solutions i.e. hypochlorite-2%, glutaraldehyde-4% and formaldehyde on the surface integrity and dimensional stability of impression pastes, irreversible hydrocolloids, polysulfide and polyether impressions. They concluded that 2% glutaraldehyde solution could be used to sterilize zinc oxide eugenol and polysulfide impressions as it did not produce any dimensional changes. Materials which are known to be hydrophilic like alginate and polyether showed dimensional changes.

Pamela Herrera et al (1986) evaluated the dimensional stability of alginate, polysulfide rubber base, vinyl polysiloxane and polyether impressions after immersion for 30 minutes in solutions of 1% and 0.5% sodium hypochlorite, 0.5% povidine iodine, 0.13% and 2% neutral glutaraldehyde, 0.16% halogenated phenol. They concluded that disinfection of dental impressions by short term immersion in sodium hypochlorite, glutaraldehydes or halogenated phenol showed the stability of rubber base impression materials. However significant changes were noticed with alginate impressions.

Abundance of literature is available on various methods applied to disinfect the impressions, along with their effect on dimensional changes produced on casts obtained from them.

M.A. Pleasure et al (1959) showed that the carriage of tuberculosis bacilli occurred in all procedures of complete denture treatments starting from impressions to try-in. They have also cited following effects of germicidals (70% alcohol, 5% Lysol, 11.5% and 10% formalin) on impression materials:

1. Two types of impression compounds softened and deteriorated in 70% alcohol and in 5% Lysol, the surface was attacked whereas formalin had no effect in all three concentrations.
2. In zinc oxide eugenol, colour change occurred with 70% alcohol, but 10% formalin had no effect.
3. In rubber base impressions colour change and bleaching of impressions to bleaching softening and deterioration.

A study conducted by M.R. Trevelyen (1974) in which he soaked alginate impressions of 2 models in glutaraldehyde and sodium hypochlorite for 16 hours. The models obtained from both groups showed dimensional changes. It was concluded that immersion in glutaraldehyde was preferable to sodium hypochlorite as magnitude of dimensional changes produced was less. Based on their observations glutaraldehyde was recommended for alginate impressions.

Disinfection techniques: Once the impression is rinsed and shaken to remove excess water, it must be disinfected. This may be accomplished by immersing the impression in, or spraying it with, an acceptable disinfectant.

Disinfection of an impression by immersion:

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Disinfection of an impression by spraying:

1. Place rinsed impression into a zippered plastic bag containing appropriate disinfectant.
2. Leave it immersed in disinfectant for 15 minutes. Polyether components and hydrocolloids may be adversely affected by disinfectants; therefore their immersion time is limited to 10 minutes.
3. Remove impression from disinfectant.
4. Rinse with running water and shake off excess water.
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**Pour the impression:**
Once the impression has been disinfected it may be poured in the desired stone.

**Hydrocolloid impressions:**
A number of investigators have evaluated disinfection of irreversible hydrocolloid (alginate) sometimes with contradictory results. Based on these findings, the ADA recommended disinfecting alginites by immersion in diluted hypochlorite, iodophor or glutaraldehyde with phenolic buffer. Investigators reported significant adverse effects of specific materials with disinfectants that are non-reactive with other alginites suggesting that caution should be exercised. Given the hydrophilic nature of the material, a minimal disinfection time should be used.

Limited data are available on disinfection of reversible hydrocolloid, however research data suggest that there is no effect on dimensional accuracy of impressions immersed in an iodophor diluted 1:213, 5.25% sodium hypochlorite with a dilution 1:10, 2% acid glutaraldehyde with dilution of 1:4, and glutaraldehyde with phenolic buffer diluted 1:16 immersion in 2% alkaline glutaraldehyde has significant adverse effects on the impressions and resultant dies.

**Rubber base impression materials:**
They can be disinfected by immersion in iodophor, diluted chlorine solution, glutaraldehyde or complex phenols for the time required for tuberculocidal activity. It is important to review the method of disinfection with the manufacturers to prevent distortion of the impression or loosening of the adhesive bond between the impression tray and impression material. These impressions also should be rinsed with water before pouring. It is important to inform the dental laboratory that the impression has been disinfected to prevent the laboratory personal from performing more disinfection procedures that might distort the impression.

Studies by a number of investigators have shown that polysulphides and silicones are relatively stable and can be disinfected without adverse effects by immersion in most disinfectants approved for use in dentistry. Although hydrophilic, polyether impressions also can be disinfected by immersion, but exposure times should be kept to minimum (10 minutes). Disinfectants requiring exposure times greater than 10 minutes for tuberculocidal disinfection probably should be avoided with polyethers. Immersion in acid glutaraldehyde actually improves the surface detail reproduction of elastomeric impressions.

**Zinc Oxide Eugenol (ZOE) and compound impressions:**
Limited data are available on disinfection of ZOE and compound impressions. Adverse effect have been reported on ZOE immersed for 16 hours in diluted hypochlorite and on compound by all of the disinfectants tested (hypochlorite, formaldehyde and 2% alkaline glutaraldehyde).

**Dental prosthesis and appliances:**
The ADA recommends disinfection by immersion in iodophors or chlorine compounds. Although both of these disinfectants are somewhat corrosive, studies have shown little effect on chrome cobalt alloy with short-term exposure (10 minutes) to iodophors or 1:10 hypochlorite. Damage of heat cured denture base resin has been shown to occur after only 10 minutes of immersion in a glutaraldehyde with phenol buffer, although immersion in 2% alkaline glutaraldehyde did not damage the acrylic surfaces. Given the tissue toxicity of glutaraldehydes and phenolics, however iodophors or chlorine compounds are preferred for disinfection of acrylic appliances.

Prostheses never should be stored in a disinfectant before insertion. After disinfection and thorough rinsing, acrylic items can be stored in diluted mouthwash until inserted. Fixed metal/porcelain prosthesis may be disinfected by immersion in glutaraldehydes for the time recommended for tuberculocidal inactivation by the disinfectant manufacturer. In addition several clinical services have confirmed that fixed prosthesis can be disinfected by short immersion in diluted hypochlorite without apparent harm to the device. The higher the content of noble metal, the less the likelihood of adverse effects on the metal core should be taken to minimize the exposure times of metals to potentially corrosive chemicals. Iodophors probably could be used as well, but no data are available to substantiate this. Unglazed porcelain should not be exposed to any disinfectant and (porcelain firing/ glazing will suffice), fixed metal prostheses can be sterilized with ethylene oxide or even by autoclaving if desired. Any device that has been immersed in a disinfectant should be rinsed thoroughly before delivery to the patient.
Prostheses or appliances that have been worn by patients should be cleaned thoroughly before disinfection by scrubbing with a brush and an antiseptic handwash or by cleaning in an ultrasonic unit.

Dentures or other acrylic appliances that have been worn by patients and require repair should be disinfected, after cleaning and before handling should be handled (i.e. with gloves) as contaminated even after disinfection. The porous nature of acrylic makes such devices difficult to disinfect adequately.

**DISINFECTION OF WAX BITES, WAX RIMS, CASTS, CUSTOM IMPRESSION TRAYS & BITE REGISTRATIONS**

Wax rims and wax bites should be disinfected by the spray wipe spray method using an iodophor as recommended by the ADA. Rinse spray may be more appropriate for wax bites. For adequate disinfection these should remain for the time recommended for tuberculocidal disinfection. After the second spray, they can be enclosed in a sealed plaster bag for the recommended time. These items probably should be rinsed again after disinfection to remove any residual disinfectant.

Bite registrations made of various materials such as ZOE or compound can be handled in the same manner as impressions of the same materials. These registrations also can be disinfected, using the rinse spray rinse technique, with most EPA registered hospital level tuberculocidal disinfectants used as sprays (chlorine compounds should not be applied to ZOE). After disinfection, the registration should be rinsed again to remove residual disinfectant.

ADA recommends that stone casts be disinfected by the spraying until wet or immersing in a 1:10 dilution of sodium hypochlorite or an iodophor. Casts to be disinfected should be fully set (i.e. stored for at least 24 hours). Investigators submerged die stone models in a variety of disinfectants and found that with 1:10 sodium hypochlorite and 1:213 iodophor, undesirable physical effects on set die stone ranged from none to minimal.

A disinfectant stone now is marketed and has been shown to have bactericidal property however this product is not yet EPA registered as a disinfectant. Several investigators have recommended adding disinfectants to gypsum during mixing (i.e. As all or part of the liquid, when pouring casts). Although such products have potential for use in infection control, they do not solve the problem of the contaminated impression or tray as a source of infectious microorganisms during transit from the operatory to the laboratory.

Custom acrylic resin impression trays should be disinfected by spraying with surface disinfectants or immersing in either 1:213 iodophor or 1:10 sodium hypochlorite. They should be rinsed thoroughly to remove any residual disinfectant and allowed to dry fully before use. After use in the mouth custom trays should be discarded.

Other prosthetic items:

Heat stable items such as facebow forks orthodontic pliers and metal impression trays that come in contact with oral tissues should be heat sterilized rather than disinfected.

Articulators and facebows should be cleaned and disinfected. After manipulation chairside (wooden handled spatulas should be cleaned and disinfected). Other times such as Hanau torches should be disinfected after use, or the area to be touched should be covered with a barrier such as plastic wrap to prevent contamination. Rubber bowls should be cleaned and disinfected after chairside use.

Items such as shade guides should be cleaned and disinfected to avoid cross contamination. If iodophors are used on shade guides, they should be wiped with water or alcohol after the exposure time to remove any residual disinfectant.

Ultraviolet light is a part of electromagnetical spectrum. It ranges from 400nm downwards to approximately 150nm. It is well established that greater germicidal effect is in the range of 240-280nm with the optimum being 253-7nm. This is widely accepted as a near maximum for bactericidal and germicidal effect. Most investigators show that the rays are absorbed by the cellular DNA chain which is the initial event in the chain of events leading to cellular death.

Robert J. Boylan et al (1987) under UV light with a wavelength of 254nm as a mode of sterilizing complete dentures, partial dentures and a rubber base impression contaminated with fine known species of
microorganisms. The results showed that killing of microorganisms with greater than 98% within 15 seconds and 99% either 30 seconds and 100% in 2 minutes. They also concluded that UV light cannot be used as a sole means of disinfecting the impressions because of shadowing effect that allows the survival of microorganisms unexposed to UV light.

IV. PROTOCOL FOR UNIVERSAL PRECAUTIONS IN DENTAL CLINIC

Staff protection measures:

- The wearing of gloves reduces contamination of hands with blood. They may be disposable or sterilizable gloves. If resterilization is planned, the gloved hands should be washed with soap and rinsed again. The gloves should be checked for holes and discarded if defective. The gloves that pass the test can be dried, powdered and packed for sterilization.

- Hands should be washed between patient contacts, after degloving and before regloving. Use of disinfectant scrub like chlorhexidine after washing will have a prolonged antibacterial effect against microbes ingressing through the gloves. Hands must also be washed after touching intimate objects likely to be contaminated by blood / saliva from patients and before leaving the dental treatment area.

- Clinic attire should be worn only in the dental environment and should be changed at the end of the treatment schedule.

- Use of mask is usually indicated especially during procedures that cause splashing / spattering of blood / saliva. It is recommended that facemasks should be changed once every hour / between each patient contact, which ever occurs first.

Protective eye wear

It may be in the form of glasses and / or a facemask. It should prevent trauma to the eye tissue from flying droplets / aerosols. Protective glasses should be washed with soap first, these rinsed with water and wiped with an appropriate surface disinfectant. Plastic safety lenses can also be immersed in alkaline glutaraldehyde solution and should be thoroughly rinsed to avoid possible irritation to skin and eyes.

Management of instruments:

They should be cleaned and dried, lubricated if necessary and packaged before loading into the autoclave. Cleaning involves an initial presoaking with detergent solution containing disinfectants to soften organic debris and begin microbial kill. After cleaning the instruments should be dried.

All moving parts of the instruments specially handpieces should be lubricated prior to steam sterilization. The burs should be autoclaved / maintained in high level disinfection of not less than 3 hours. Thorough rinsing should be followed to remove all traces of disinfectant.

Touch surfaces like unit handles, light handle, light switch, chair controls, head rest knob, trolley handle, trolley and spectrum handpiece and 3-way syringes cannot be disconnected and sterilized and therefore need to be treated with disinfectants covered with a protective barrier. However instruments which enter oral cavity and are connected to some of the equipment e.g. air rotor and surgical handpieces, ultrasonic inserts / tips, airwater syringe tips and light cure probes / tips should be disconnected, sterilized and rinsed.

Disinfection of surfaces involves the cleaning of surfaces, after every patient and application of a disinfectant chemical. These chemicals include alcohol (spirit), iodophor products, synthetic phenols, glutaraldehyde, chlorines etc.

The advantages of barriers include ease and speed of insertion, standard sizes and the protection of equipment from damage by chemicals, blood and fluids.

Spitoons should be flushed with water, scrubbed and disinfected.

Waste buckets should be used with disposable plastic bags as liners to be changed wherever necessary.

Role of reducing aerosols in the clinic:
Preoperative mouth rinses with chlorhexidine gluconate or other suitable disinfectant mouth wash should help reduce infectious particles in aerosols. Rubber dam isolation is another method to reduce potentially infective aerosols. High volume secretion during procedures using copious irrigation and even the routine use of saliva ejectors can restrict aerosolization.

V. CONCLUSION:
Prevention is better than cure. The main ways of control is by discarding all the contaminated instruments and materials and try to use as much as disposable items. The dentist and assistant should take proper vaccination in proper time. It should be done any treatment with minimal instruments using.

The material, which is sent to the laboratory, should be disinfected before the technician contact it should be kept in a separate room for disinfection, for all the patients’s work, which is sent. For each patient the material used should be separate or it should be discarded after each patient work or disinfect it before use of it. The dentist should not think only their health, they should consider the environment also when the dispose of the used materials.

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