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RESEARCH ARTICLE

INFECTION CONTROL IN DENTAL RADIOLOGY - REVIEW

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Abstract

From an infectious point of view, dentistry has never been safer than it is today for both patients and dental team. This state has resulted from establishment and practice of strict infection control protocol in the dental office using universal infection control methods.The potential for cross-contamination in dental radiology in every dental setup is extremely high especially when intraoral radiographs are exposed and processed.Implementation of infection control in dentistry entails the prevention of infection transmission from within the dental clinic environment. Such a policy protects both patients &staff reducing crosss cotamination and infection. Implementing a safe and realistic infection control procedures requires the full compliance of the whole dental team. Hence this literature review all the available measures and techniques in the field of infection control in dental radiology department.

Introduction:-

World Health Organization defins health as : "health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity .Most criticism of the who definition concerns the absoluteness of the word “complete” in relation to wellbeing . The requirement for complete health“would leave most of us unhealthy most of the time [1,2].

As human beings, our health and the health of those we care about is a matter of daily concern regardless of our age, gender, socio-economic or ethnic background, we consider our health to be our most basic and essential asset. Ill health, on the other hand, can keep us from going to school or to work, from attending to our family responsibilities or from participating fully in the activities of our community[3].

Healthcare associated infections are preventable through implementation of best infection prevention and control practices. This will facilitate the delivery of high quality health care for patients and a safe working environment for our healthcare worker. National guidelines are developed to provide a co-ordinated approach to the prevention and management of this. The guidelines are based on the best available current evidence[4] .

An infection control programme puts together various practices which, when used appropriately, restrict the spread of infection. Breach in infection control practices facilitates transmission of infectionfrom patients to health care workers, other patients and attendants. The world health organization has recognized severe acute respiratory syndrome as the first serious and readily transmissible disease to emerge in the 21st century. “Standard precautions” require that health care workers assume that the blood and body substances of all patients are potential sources of infection,regardless of the diagnosis, or presumed infectious status.Facilities, equipment, and procedures necessary to implement standardand additional (transmission-based) precautions for control of infections are·

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1. Cleaning, disinfecting and reprocessing of reusable equipmentwaste management
2. Protection of health care workers from transmissible infections
3. Infection control practices in special situations[1].

Dentistry is predominantly a surgical discipline, involving exposure to blood and saliva. A high standard of infection control practices are necessary in improving patient safety and reducing occupational exposures to bloodborne diseases. Apart from bloodborne diseases such as hepatitis b and c and HIV infections, dental health care workers are at risk of acquiring respiratory, sexually transmitted, and childhood diseases among others encountered in dentistry[5].

Transmission of infectious agents among patients and dental health care personnel in dental settings is rare. However reports suggest reporting of such infections. Reported breakdowns in basic infection prevention procedures included unsafe injection practices, failure to heat sterilize dental hand pieces between patients.Highlighting the need for comprehensive training to improve understanding of underlying principles, recommended practices, their implementation, and the conditions that have to be met for disease transmission summary of infection prevention practices in dental settings is warranted.

According to Seymour, statements such as "you cannot have good general health without good oral health" and "the mouth is part of the body" are now considered obvious. The oral cavity is also the intersection of dentistry and medicine, semi-independent professions that share the same common goal of improving the health and qualityof life of patients. at the heart of each profession is the basicconcept that appropriate interventions within the framework ofthat discipline will have an overall positive impact on patients'health, welfare, and quality of life.[4]

All dental settings, regardless of the level of care provided, must make infection control a priority and should be equipped to observe standard precautions and other infection prevention recommendations. Implementing a universal infection control protocol in all dental departments ensures the prevention of infection transmission from within and outside the clinic assuming that all patients are carriers of one or other infectious diseases . Various steps taken for obtaining total protection can include personnel training programmes,patient counselling, instrumentsterilization, using proper disposable means, disinfection, enforcement of law pertaining to infection control.[6,7]

Usually the radiologist are spared from all infection control andother such training programmes because they are overlooked.[8]

Radiographic examinations area complementary tool for diagnosing major diseases of the oral cavity. They have increased in popularity with in the last few years of time. With the advent of digital radiography conventional mode is being rubbed away from the diagnostic strategy. Reduced exposure is the main advantage of this mode, which makes it a common mode for all practising dentist nowadays. Few other advantages are easy storage, manipulation of the image, electronic image transmission, etc.the change in conventional to digital makes it more warren to use the infection protocol strictly, so as there is a chance to for cross contamination because of reuse of same image receptors. So implementation of standardized infection control and prevention practices is increasingly relevant and all personnel should abide to rules so that the modern radiology practice evolves into its more clinical role .Infectious diseases transmission in radiology dept.occurs in direct and indirect method.[9,10]

The chance for cross-contamination in dental radiology is extremely high, especially when dark room procedures are carried out without necessary precautions. Even while exposing a radiograph could also give a chance for cross contamination. Since the personnel comes in contact with saliva, which is good medium for cross contamination.

Several studies have confirmed that cross-contamination occurs during the exposure and processing of intraoral films. the x-ray cone, the exposure control knob, the timer switch, the x-ray film placement area in the darkroom, the x-ray film feeding area in the automatic film processor, and the revolving door to the darkroom, became contaminated while taking radiographs,. As aids epidemic, an increased emphasis has been placed on medical and dental procedures to minimize blood borne pathogen exposure.All body fluids, secretions, and excretions (except sweat) as potentially infectious, regardless of whether they contain blood.Infection control practices are designed to create and maintain a safe clinical environment to eliminate or minimize disease transmission during patient treatment.Bacteria can survive in used dental radiographic developer and fixer for up to two weeks.

Wearing of gloves should be made mandatory for all personals in dental radiology while handling with films and patients. Hand washing should be madecompulsory for all staff in dept. and it should be remembered the hand washing is not an alternate or substitute for using gloves. The lack of hand washing habit, which is in fact a simple and cheap measure, is responsible for more than 50% of hospital infections.Hygienic hand washing alone is also enough to remove the temporary flora.[11]

Routine (hygienic) hand washing technique:

1. Accessories like jewels are to be removed.
2. The hands are wetted under running water.
3. The wrists, the palm and back of the hands, the tips and sides of fingers and nails are washed with soap scrubbing for at least 20 seconds.
4. The hands are thoroughly rinsed under water.
5. Hands are dried with paper towels beginning from the wrists.
6. The same paper towel is used to turn off the tap.

Usually unpowered gloves are usedand these should be never reused, ordisinfected. It should be never reused for another patient .Proper hand washing both before and after wearing gloves is another important means for preventing cross infection.

Another method is covering allexposed surface with thin biodegradable plastic sheet which can keep these surface clean and disinfected. This act as a barrier and prevents cross contamination and eliminate the disinfecting between each patient. After each patient's treatment all surfaces and items contaminated with saliva should be thoroughly cleaned and disinfected using a suitable chemical germicide that provides intermediate level disinfection. Then all surface should be covered with such a barrier. Gloves should be strictly used while removing such plasticbarriers. All reusable instruments in radiology should be cleaned using high level disinfectant.[12]

Another important step is disinfecting all instruments and accessories used in the department. All accessory instruments used in radiology department are a good medium for cross contamination, for e.g. the holder used is a good surface medium or the transfer of infection f any grade through the saliva sticked on to it. Because of the holder is made of plastic material which cannot be autoclavable ,thus providing a good surface for the transfer of infection .all such instruments should necessary be disinfected using appropriate solution .these instruments are classified as semicrtical and noncritical .Allholders come under semicrtical type of instruments. These type instruments should be disinfected using high grade disinfectant which are capable of destroying all bacterial spores,as long as they are used in sufficient concentrations and with appropriate contact time.And this procedure should be carried between each patient.

However disposable item if possible can be substituted for this type semi criticalaccessories between each patient which gives more hospitality and can win the patient confidence .noncritical items are different protective barriers like thyroid collar, lead apron,goggles etc. which requiresonlyintermediatetype of disinfection .because they do not come directly in saliva contact. The xray cone, exposure control, control panel etc.should be covered with appropriate barrier and disinfectedoccasionally or ona weekly basis.

Another important medium for cross contamination are the radiographic films . These are kept directly in the mouth which comes contactwithsaliva, and thus crosscontamination is possible. Before placing in tothe indicated site these films should be covered with this transparent plastic cover which can be removed before the processing methods. Transferring the exposed films should be done only in a paper glass to the processing area where it can be carefullyremoved from the plastic rapper using gloves .In case where sensors are used in digital method then the sensors are first covered with plastic barrier then it is covered with gloves.

Infection control practices during film exposure:

1. Dry each film with a paper towel after taking it from the patient's mouth to remove excess saliva.
2. Place the film in a disposable container such as a paper cup before transporting it to the processing area .
3. Do not touch the disposable container while wearing contaminated gloves.
4. During exposures, film-holders should be transferred to a protected by a surface barrier.[13]

Infection control practices after film exposure:

1. Exposed radiograph should be transferred.
2. 2 All accessoriesdevices should be kept in place for dissecting its surface.
3. All disposable contaminated items should be discarded in accordance with norms.
4. The gloves should be removed and hands washed once all contaminated items are removed and disposed.
5. Now the lead apron may be removed and the patient dismissed from the x-ray exposure area.[14]

Infection control practices for film processing:

1. Prior to taking the films to the processing area, the gloves should be removed, the hands washed, the area cleaned up, and the patient dismissed.
2. The gloves, paper towels, and paper cups are necessary for film handling prior to processing.
3. A paper envelope or film mount is used to hold and store the film(s) after processing and should be labelled with the patient's name and date.[15]

Infection control practices during extraoral radiographic procedures:

1. Prior to taking an extraoral radiograph, wash his or her hands.
2. The patient should rinse with a preprocedural mouthwash before the procedure. After the procedure, ask the patient to remove the barrier on the bite guide.
3. For hygienic purposes, the patient chin rest, head-positioning guides, and handgrips can be barrier-protected or cleaned after film exposure.
4. Since patient secretions normally donot contaminate extraoral cassettes, cassettes can be handled with ungloved hands.
5. No other infection control steps are necessary for processing.[16]

The importance of effective control of infection measures during dental radiography cannot be over-emphasized.Inadequate infection control measures may put other/subsequent patients at risk from infection whether transmitted directly or indirectly.[17,18]

Summary:

Infection control has become a significantpart of dentistry. All dental offices and clinics should develop written infection control protocol thatdescribes specific practices to prevent cross-contamination and transmission of infection .Its mandatory is to practice proper aseptic protocol so as to prevent a hospital based transmission of infection (iatrogenic). Dental radiology department should make stringent rules and it has to be obeyed by all personnel working in the department, so as ensure no crosscontamination or transmission of infection occurs between patient and among the personals. Specific infection control practices are recommended before, during, and after film exposure and during the processing of intraoral radiographs.The infection control methods described in this article are simple and easy to follow for all personnel. Infection control practices are changing constantly and it is important that radiology personnel stay abreast of these changes.The potential for cross-contamination in dental radiology is very high but by adopting effective infection control practices can reduce this potentiality, protecting both patients and staff.

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