OVERVIEW REGARDING PRACTICAL IMPLICATIONS OF ASEPSIS AND ANTISEPSIS, STERILIZATION IN THE PREVENTION OF ORO-MAXILLO-FACIAL INFECTIONS

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Abstract: Until recently, the problem of contamination in dental medicine, with all related clinical entities, was mainly summarized in infections with anaerobic germs. The emergence of new infectious manifestations, especially viral, emphasized the potential existence of a wide variety of microorganisms in blood or saliva. For dentistry, the major difference is not in properly sterilizing or decontaminating, but in maintaining proper asepsis throughout the working day throughout the operative act. The increase in the risk of airborne contamination in the dental office, as well as the appearance of new viral diseases for which current treatments are insufficient, require a change of mentality in dental practice.The dentist is obliged to equip himself with appropriate means of prevention and to organize his activity in such a way as to minimize the degree of infection of the office and implicitly of the patients.

Key word:asepsis, antisepsis, sterilization, prevention, oro-maxillo-facial field

Until recently, the problem of contamination in dental medicine, with all related clinical entities, was mainly summarized in infections with anaerobic germs. The emergence of new infectious manifestations, especially viral, emphasized the potential existence of a wide variety of microorganisms in blood or saliva. Thus, in the professional activity of the dentist and the assisting staff, in unavoidable contact with patients, there is a risk of contamination in 2 ways, in 3 ways:

- indirect or airborne route (air pollution)
- direct route (through skin contact)

Regardless of the route followed (through the air or through the skin), contamination can be done:

- from the patient to the doctor and the supporting staff
- from doctor to patient
- from patient to patient

Indirect way (air pollution). In the hospital environment, the indirect route is responsible for only 1% of the detected contaminations; it is instead very frequent and important in polyclinics and dental offices. Air pollution is a feature of the dental specialty[1-3].

Spontaneous air contamination is caused by microorganisms found in the ambient air fixed on solid supports (inert particles, cellular debris, skin scales) or liquids coming from the patient's mouth and/or oropharynx in the form of septic projections.

Air pollution is caused by the dental cloud that is formed during the use of the cooling spray of the high-speed rotating instruments, the turbine, the ultrasonic scaler. The air and water under pressure, after being projected onto the teeth and the surrounding mucosa, are atomized into the air of the dental office mixed with saliva, subcellular re or coronary fillings, microorganisms, oil droplets from the turbine, bone particles sometimes tartar, pus And so on

The "cloud" thus formed is projected towards the airways of the practitioner, the patient and towards the inert vectors: instruments, clothing, equipment, floor. Aerosols therefore, containing particles of different sizes between 1-5 microns, are loaded with microbial flora consisting of exceptionally pathogenic basic flora, variable accidental flora, 85% contain pathogenic microorganisms. Aerosols enter the upper airways in their appendages (sinuses) and the bronchial tree. The amount of particles that reach the lung alveoli during dental treatments is determined by the volume of air breathed per minute, the distance between the alveolus and the working field, the amount of water used for cooling and the direction of the jet, the amount of fragmented metal, the amplitude of respiratory movements[4-6].

The risk of contamination is much higher for patients with low immunity (either through corticoid treatments, chemotherapy, in those with kidney transplants, collagenosis, AIDS). But even in patients with normal immunity, following air pollution with highly pathogenic, resistant and easily disseminated germs, pneumopathies can develop, for which at present the treatment still has many unknowns[7-11].

Airborne transmission of pathogens can therefore be achieved in 2 ways:

- interhuman from patient to medical staff and from medical staff to patient
- by means of an inert vector

Direct route (cutaneous or mucosal). Infections by contact target the hands, but equally the contaminated instruments, the towel, the sink that contribute to the dissemination and multiplication of some germs in the soda . The moist, macerated epidermis contributes to the development of bacteria, which are often saprophytic. Great importance is attached to hepatitis B, HIV, c viruses that can penetrate the skin or mucous membrane through a continuity solution (escoriations, ulcerations, cracks, wounds), not always visible. Incidents of inoculation can occur by injuring the practitioner with used and infected materials: scalpel, burs, needles, etc. but also through septic projections (blood, tartar, saliva). These incidents can be at the origin of septic infections, especially with anaerobic flora, but also at the origin of hepatitis B virus infection. The theoretical risk of contamination in the face of an AIDS patient depends on the way the virus is transmitted, its presence and concentration in the blood especially, but also in saliva, during contact, the investigations regarding the medical

personnel who come into direct contact with the sick have demonstrated that, even in the absence of special precautions, HIV contaminations were exceptional and always in accidental circumstances (stings, prolonged contacts of hands that have damaged skin with contaminated blood). Overall, the risk of accidental contamination exists, but it is approximately less than 1%[12,13].

Compliance with the rules of asepsis and antisepsis - prevention factors of oro-maxillo-facial infections

Asepsis and antisepsis measures in dentistry concern: the doctor and his collaborators, the patient and the operating field, the dental office and the instrument circuit.

The doctor and his collaborators. The dental office appears as a closed space where there is a permanent risk of direct or indirect contamination, from patient to doctor, from doctor to patient, from one patient to another patient. To prevent the transmission of viral or bacterial infectious agents, we believe that the doctor and collaborators must follow personal protection protocols by introducing adequate physical barriers between him and the patient, which is not an option, but an obligation in today's dental care. The recommended physical barriers to achieve a satisfactory hygienic way of working are: uniform, sterile gown, oral-nasal mask, gloves, protective glasses[14,15].

The patient and the operative field. It is important to determine before any surgical intervention whether the patient is at risk or not, and for this purpose the medical questionnaire will allow to specify the current state of health as well as his medical history. If a patient at risk is identified, then the dentist will have the opportunity to take all preventive measures for him and his assistants, as well as for the other patients who will undergo treatment.

The dental office and the instrument circuit. The increase in the risk of airborne contamination from the dental office, as well as the appearance of new viral diseases for which current treatments are insufficient, require a change of mentality in dental practice. The dentist is obliged to equip himself with appropriate means of prevention and to organize his activity in such a way that the degree of infection of the office and the patients is reduced to the maximum. The modernization of dental activity involves modern dental treatment devices, reducing the number of patients treated daily in the office, separating dental treatments that do not damage the oral mucosa from surgical interventions, performing in a separate office interventions with a higher degree of septicemia, placing the devices from the dental office in such a way as to avoid spraying them with cooling water during the use of the turbine, the use of equipment with smooth surfaces, the existence of a small number of niches, turning on and off the water and liquid soap for washing hands by photoelectric cell devices or pedals, the suppression of textile towels to wipe the hands and their replacement by hot air devices or paper napkins, the greater use of single-use items, these facilitating cleaning and also allowing a reconditioning of the workplace[16,17].

The circulation of personnel in the office must be reduced as much as possible to avoid increasing the number of microbial colonies in the ambient air. An immobile person produces around 100 colonies per minute; in motion it gives rise to 100,000-30

million colonies per minute, and 1/3 or ¼ of these colonies are contaminated.

Proper storage and handling of instrumentation and materials.

The use of ready-made sterile instrument kits for oral surgery or dental treatments is a practical method, ensures a quick service and above all avoids contamination during handling after sterilization.

Instruments used for aseptic interventions and dental extractions must be separated from instruments used in the treatment of septic lesions.

The sterile instruments are handled by a nurse who uses for this purpose a sterile service forceps, which is kept in a container with a disinfectant solution. Storage and handling of sterile instruments must be done in such a way as to avoid recontamination[18,19].

The instruments used must be separated from the sterile ones, they are not allowed to dry in the air and are not thrown into the sink because the microbes on them spread around, but are placed in a dish with a disinfectant solution, kept away from the boxes of sterile instruments.

In general, the instrument circuit in the dental office is designed in such a way that dirty instruments should not mix with sterile ones[20].

Regarding the intake of the nebulizer, this is particularly important for the Oro-Maxillo-Facial surgery departments, nebulization representing a process of decontamination of the air in a closed space that uses a series of biocidal substances that act in the form of very fine particles at the air level in the room. In this sense, the presence of special equipment called nebulizers is essential for carrying out the decontamination process, the goal pursued when using nebulizers is for the disinfectant to be transformed into aerosols with a particle size of the order of 0.5 microns so that they can act on the pathogenic agents in the air before they descend on the surfaces, thus obtaining the disinfection of both the air and the surfaces in the room.

In the absence or minimization of severe measures of hygiene, asepsis and antisepsis, the practice of dental art remained an essential link in the ways of transmission of infections. In dentistry in general and in dental surgery in particular, the fight against infection takes on some particularities imposed by the characteristics of the operating field and those of the dental office.

For dentistry, the major difference is not in properly sterilizing or decontaminating, but in maintaining proper asepsis throughout the working day throughout the operative act. The increase in the risk of airborne contamination in the dental office, as well as the appearance of new viral diseases for which current treatments are insufficient, require a change of mentality in dental practice.

The dentist is obliged to equip himself with appropriate means of prevention and to organize his activity in such a way as to minimize the degree of infection of the office and implicitly of the patients[21].

The modernization of dental activity involves reducing the number of patients treated daily in the office, separating dental treatments that do not damage the oral mucosa from surgical interventions, performing in a separate office interventions

with a higher degree of septicity, placing the devices in the dental office in such a way that to avoid spraying them with cooling water during the use of the turbine, the use of equipment with smooth surfaces, the existence of a small number of niches, turning on and off the water and liquid soap for washing hands by means of photoelectric cell devices or pedals, the suppression of textile towels to wipe hands and replace them with hot air devices or paper towels, the greater use of single-use items (plastic cups, napkins or paper fields, saliva or air cannulas), these facilitating cleaning and allowing at the same time a quick reconditioning of the workplace[22].

At the same time as adopting a modern work style, it is also necessary to observe a strict hygienic regulation of the dental office. Thus, the number of people in the office must be reduced to the maximum, the dental chair is disinfected several times a day and even after each patient, using the following products: iodophors, synthetic phenolic compounds or sprays of synthetic phenols in 30% alcohol, chlorhexidine in alcoholic solution or spray, etc. Hands are decontaminated after each patient with neophalin, then with alcohol and/or disinfectant sprays, jet washing of the unit's water line between patients for at least 15 seconds. Every morning, also before starting the activity, wash with a jet of water for 3-5 minutes, then add a disinfectant that needs 10 minutes to evaporate.

Treatment of the air in the office in order to reduce the risk of contamination by various means, such as:

a. proper airing several times a day with good ventilation can ensure satisfactory air cleaning;
b. chemical decontamination consists in the vaporization of some aromatic essences, for example: essence of pine or camphor;
c. spraying chemical products in the air in the form of gas or solid or liquid particles: either at a short distance from the place of disinfection spray or directed dispersion with products based on Glycopropylene, Glycotriethylene or Hexylresorcinol, or at a distance (dispersion is done in all points of the room through an automatic device).
   The most used product is the one based on formaldehyde (by dispersion or diffusion). According to HUET, this procedure when used in particular conditions of temperature and humidity is the most effective because it destroys the vegetative and sporulated microbial forms. It is recommended to be used at the end of the working day in the absence of people, as it is very irritating to the respiratory mucosa and is also called "terminal" decontamination. Decontamination is only effective in atmospheric humidity conditions of 70%.
d. ultraviolet rays have limited indications for reducing the number of germs in the air of dental offices and operating rooms, their antibacterial action is only effective at a distance of no more than 1 m around the lamp that produces them.

At the end of each day it is necessary to: jet wash the water line for 3 minutes and introduce a large amount of disinfectant; cleaning the unit, the furniture, wet disinfection of the floor and other surfaces, of the waste containers, with disinfectant solutions or sprays; cabinet ventilation and air decontamination.

Weekly general cleaning of the treatment rooms, the laboratory, washing and disinfection of all washable surfaces, wiping of the walls and doors, disinfection of the air by formalization is required.

Pharmaceutical factories and laboratories put at our disposal sterilizers of different capacities and performances, cleaning, disinfection and decontamination products with precise indications for use, single-use products.

Materials are sterilized using dry heat (Pupinel) or wet heat (autoclave). All that remains is to choose the sterilizer according to the sterilization cycle and profitability. Also, disposable materials can be chosen for surgery, such as: operating fields, blouses, caps, masks, gloves, suction cannulas, anesthetic needles and carpules, sutures.

Storage of materials. It is indispensable for the surgical instruments to be protected in packaging that allows it to be sterilized but subsequently to keep it sterile. These packages can be according to the sterilizer used: metal boxes, hermetically sealed Pyrex tubes, plastic bags or textile packages.

The duration of storage depends on the type of packaging and the place of storage. The date of sterilization will be written on each package and checked periodically, mandatory before use. Compresses can be bought sterile , packed in small quantities in sterile bags. Using cases for compresses, the level of contamination will be taken into account during their opening and handling of the compresses, which will be mandatory with a sterile forceps kept in a disinfectant solution.

Because surgery, due to the mandatory sectioning of the tissues involved in the pathological process, presents a much greater risk of blood contamination than routine dental care, the use of a surgical behavior protocol has generally become a rigorous rationale in oral and maxillofacial surgery interventions. This fact makes the surgeon meticulously follow the rules of asepsis and antisepsis.

Periodontology is a surgical discipline and everything that is valid in surgery is directly transposed in periodontology. The only specific thing is descaling. Ultrasonic or mechanical scaling handpieces should be sterilized if possible or decontaminated after each intervention. Active extremities in any case must be sterilized. The use of goggles, mask and gloves is recommended to avoid contamination of the care staff.

Implant surgery presents a lower potential related not only to the surgical act performed in the septic environment but also to the use of biomaterials. They are likely to be colonized by microorganisms and secondarily induce an infectious complication. The fight against infections is a permanent action, resulting from the summation of a multitude of small, habitual, well-learned and well-executed gestures within a "well-thought-out organization".

To disinfect the instruments, use:

- Dry heat sterilization is a limited process because it is difficult to achieve.
- Steam sterilization is the method of choice if the recommendations for use are followed.
- Sterilization with chemical vapors in which the liquid contains an important part of alcohol ensures the drying of the packages.
- Cold disinfection is of interest to heat-sensitive materials. A 2% glutaraldehyde bath for 10 hours will provide disinfection. This product being considered toxic, the disinfected elements will be washed with sterile water for a long time.

For handpieces, autoclave at 121 °C or chemical sterilization with aldehydes is used.

The camera can be decontaminated with a sterile pad soaked in glutaraldehyde followed by a gentle wash with a pad soaked in sterile water.

In order to avoid the risks of asepsis mistakes in odontology, we must approach the conditions imposed by surgery, i.e. to perform, if possible, a complete act in one session, not to use the cabinets in the office except for a minimum of materials or products. For this purpose we must use previously prepared trays or kits.

Endodontic instruments have a hard time bearing the high temperatures that change their resistance, they become brittle and sensitive to corrosion, the risk of fracturing being high. The sterilizer with chemical vapors is the most suitable. The only disposable tools are the absorbent paper cones supplied in the kits. Gutta-percha cones for filling the canals are decontaminated by immersing them in a well containing a solution of sodium hypochlorite.

After the intervention, the small endodontic instruments are decontaminated and cleaned with ultrasound, in a decontamination solution. They are then placed in a metal basket to avoid pricking your fingers while handling them[23].

The materials used, mainly hand tools and cutters, are durable. They can be sterilized in infancy without much inconvenience. Autoclaving is not recommended due to the risk of corrosion of the cutting edge of enameled scissors, steel or tungsten carbide burs. Formaldehyde chemical vapor sterilizer will remain the choice.

Disposable materials: high-speed suction cannulas, cotton rolls, mini sponges for applying mordants and adhesives, spatulas and paper blocks, luting cements packed in vibrating syringes, retractors, impression silicones (will be packaged in hermetically sealed plastic bags in metered quantities to avoid contamination of the product by the nurse's hands, certain silicones are presented in disposable syringes - gun with ampoules). It is preferable to use hydrocolloids packed in capsules.The most difficult orthodontic instruments to sterilize are the forceps. Orthodontics uses many special, delicate and very expensive forceps. Some tools are fragile either because they have corrosion-sensitive parts or because they have heat-sensitive welded parts. Autoclaves are contraindicated. Dry heat sterilizers are used but with some

precautions. Pupinel is contraindicated due to the too long duration of a sterilization cycle. Manufacturers provide dry heat sterilizers equipped with a ventilation system. The operating temperature is 190 °C, the duration of the sterilization cycle is 15 minutes. These sterilizers have been specially recommended for orthodontic forceps. Another sterilizer is required for the rest of the materials and instruments[24].

Regardless of the use of classic or digital manipulations, the rules of asepsis and antisepsis remain paramount, in conjunction with the requirement of sterilization so that we can obtain optimal results in terms of the patient's sanogenicity.

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