

Surgical attire: a review article

Paramentação cirúrgica: artigo de revisão

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ABSTRACT

This review focused on the description of surgical attire and its actual requisite use. Surgical and anesthetic procedures require that precautions are taken to reduce biological risk to patients and to the multiprofessional team in contact with fluids, organic tissues and infectious agents in the surgical center. Its purpose is protecting patients and the multiprofessional team against microorganisms existing and released in the surgical center. Use of surgical attire includes the exchange of everyday clothing for more adequate pieces in restricted or semi-restricted areas in the operating room, thus providing barriers against the invasion of microorganisms. A selection of articles published in MEDLINE, LILACS, PUBMED, COCHRANE LIBRARY and books were used. There are no regulations in place for the use of surgical attire, and its use is controlled by each municipality's health surveillance team as well as by internal rules of operation in every surgical center. It constitutes an effective measure to decrease postoperative infectious processes, even though several studies contradict with regards to the actual sources and modes of transmission of microorganisms in the operating room.

Key words: Surgical Attire; Protective Clothing; Exposure to Biological Agents/prevention & control; Infection Control.

RESUMO

Esta revisão objetivou a descrição da paramentação cirúrgica e suas reais necessidades. Procedimentos cirúrgicos e anestésicos tornam necessárias precauções para reduzir os riscos biológicos que ocorrem em pacientes e na equipe multiprofissional em contato com líquidos, tecidos orgânicos e agentes infecciosos em centro cirúrgico. Seu intuito é proteger pacientes e a equipe multiprofissional contra microrganismos presentes e liberados em centro cirúrgico. A paramentação cirúrgica é a troca das vestimentas rotineiras por outras adequadas, em áreas restritas ou semirrestritas do centro cirúrgico, proporcionando barreiras contra a invasão de microrganismos. Utilizou-se a seleção de artigos publicados na MEDLINE, LILACS, PUBMED, COCHRANE LIBRARY e livros. Não existem normas de leis para o uso da paramentação cirúrgica, ficando sob a vigilância sanitária vigente em cada município e ainda às normas internas de funcionamento de cada centro cirúrgico. Constitui-se em medida eficaz na redução dos processos infecciosos pós-operatórios, mesmo com resultados contraditórios em vários estudos sobre o reconhecimento das reais fontes e formas de transmissão dos microrganismos em um centro cirúrgico.

Palavras-chave: Vestimenta Cirúrgica; Roupas de Proteção; Exposição a Agentes Biológicos/prevenção & controle; Controle de Infecções.

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INTRODUCTION

From the simplest to the most complex surgical and anesthetic procedures, precautions are necessary to reduce biological risks in multidisciplinary teams in surgery centers (SCs).¹⁻³ The conditions that place patients and surgical teams in contact with blood, fluids, and organic tissues require strict observation of rules and routines to minimize the risk of nosocomial infection.¹⁻⁵ One of these procedures is the use of appropriate surgical attire, which varies according to access area and the wearer's role.

Surgical attire was created to protect patients in SCs from biological hazards caused by microorganisms present in the environment and those released by themselves, doctors, staff, equipment, and the ambient air.⁴ As the risks for multi-professional teams become a reality, attire affords protection also for professionals involved in the various activities in a surgical center.

Surgical attire requires changing from ordinary clothes to suitable garments inside the premises of a SC, creating barriers against microbial invasions in patients' surgical sites and for the protection of workers against exposure to blood, bodily fluids, or organic tissues therein found.^{1,2,4}

All healthcare workers, before entering a surgery center's cleanroom or restricted area must change out of their garments in the dressing room, located in the semi-restricted area, into scrubs or surgical attire (top and pants), shoe covers, caps, masks, and gloves. Sterile surgical aprons and gloves are to be put on in the SC's restricted area before starting any procedure^{2,6}.

Suitable attire must follow the hospital's specifications and biosecurity technical standards, both in its manufacturing and in shapes, sizes, types of fabric, whether reprocessed or disposable. Proper use begins with dressing process by following the correct sequence and ends with removing the attire appropriately^{2,7}.

UNIFORMS OR SURGICAL SCRUBS

These include a coat and bottoms, usually made of cotton, non-sterile and reprocessed. Their use is restricted to the internal premises of SCs and health workers must change them in long-haul operations.^{2,3} The coat must completely cover the skin of the upper body, underarms and upper arms, from the end of the

neck down to the pelvis, in order to provide the wearer with a barrier against incoming or outgoing microorganisms. They must be available in different sizes to fit different wearers. The pants must completely cover the lower limbs, from the waist down to the ankles, and at this level they must have an elastic band for closure.^{2,3,6} They must not touch sterile surfaces, as they are not sterilized. Workers must get changed in the appropriate dressing room right before entering the SC's restricted area^{2,3,6,8}.

SHOE COVERS

Must be put on before entering the SC's restricted area and their purpose is to prevent floor contamination by microorganisms on the soles of the wearers' shoes. Their efficacy in controlling hospital infections is still questioned,^{1,2,3,9,10} even after treading on organic secretions.^{2,6,11} The act of walking increases dispersion of microorganisms on the floor more than that the type of foot cover worn. Contamination of surgical wounds takes place through bearing and contact more than through propagation of microorganisms from the floor into the ambient air. Nevertheless, shoe covers³ should be worn on top of shoes to ensure further protection to wearers,^{2,3} thereby avoiding needlestick injuries to the foot. Because of their porosity, denim scrubs, in various sizes and types of fabric, and provided they are clean and dry, are a more efficient microbiological barrier than those made of cotton percal, cotton blends or disposable materials, as long as their reprocessing is strictly controlled.³

SCRUB HATS

There are different sizes and types of fabric to avoid contamination of the surgical field by hair or hair microbiota,^{3,10} even if the majority of these species is not pathogenic. They must be put on before entering the SC's restricted area and fit properly in order to completely cover both hair and face by a single piece. They do not need to be sterilized and must not touch sterile surfaces.² Hats which are tied below the nape and do not have an elastic band leave a large amount of hair exposed. They are considered more adequate when fitted with an elastic band all around the opening, either disposable or made of fabric, and follow strict reprocessing controls.³

SURGICAL MASKS OR RESPIRATORY PROTECTION

Their use is justified considering their effectiveness in filtrating particles larger than 5 microns, although not all particles expelled from the wearer's oropharynx in the acts of speaking, coughing or sneezing contain microorganisms. Patients must be protected from particles,^{3,12} as must the mucous membranes of health workers from infecting droplets from patients.¹² The masks must have minimum filtration capacity over a certain period of time, which has caused difficulty in finding the most suitable material.^{3,7} They must completely cover the area from the nasal base to the mouth and attach to the chin by adhering to the skin around that area and on the sides of the face. The types of surgical masks used include the disposable pleated type, made of polypropylene or polyester, or the double cotton gauze type with a malleable metal wire that can be fitted to the nose. They are not sterile and should not come into contact with sterile surfaces. They must be changed when wet or soiled or after four hours of use, when their protective efficacy decreases, and they should never hang from the neck or be stored in pockets for reuse.^{1,7,10,13}

EYE SHIELDS, GOGGLES, OR PROTECTIVE EYE MASKS

Recommended especially for the health worker's protection against contact with patients' blood, secretions and fluids^{3,14,15} and available in many materials and colors, they must adhere to the skin without causing discomfort. There has been some resistance against the use of large acrylic or glass visors and face shields against fluids; it is claimed that they decrease the surgeon's visual acuity and become filled with steam from the air inlet aperture. They are not sterile and should be for the health worker's personal use and cleaned before use.^{3,14,15}

SURGICAL APRONS

Dressed on top of the surgical uniform in the SC's restricted area, they prevent microorganisms from spreading from the health worker's body into surgical

sites, as well as protecting the health worker from exposure to the patient's blood, secretions, and fluids, which could contaminate him or her.^{2,3} Different fabrics have been used and researched, but a consensus about which is the best has not been reached. Available in different sizes for different-sized wearers, they must begin at the end of the neck, completely cover the trunk, upper limbs down to the wrists, and lower limbs down to below the knees, allowing free movement.³ They are sterile and should come in sterile packages. When unfolding and putting them on, only the inner side must be touched, the part that will be in contact with wearer's body.^{2,3} They are closed with strips tied around the back by a nurse. The cuffs should be made of elastic fabric so as to smoothly compress the entire circumference of the wearer's wrist. A small loop of fabric through which the thumbs must pass ensures the hands are fixed by the apron, thus keeping the sleeves from rolling up and exposing the forearms. Aprons must not come into contact with non-sterile surfaces and should be removed from the inner side with a nurse's assistance to untie it. Although there are disposable aprons, they are not indicated for use in long-haul surgical procedures on account of the material's porosity.^{2,6} Denim or cotton aprons are preferred because they hinder the passage of blood, secretions and/or fluids. They can, however, generate discomfort in longer surgeries through increase of perspiration and release of the wearer's microbiota, and also by reducing body evaporation.^{2,10} There is no suitable method to define the ideal porosity³ for aprons or their resistance to different circumstances or reprocessing control and their intactness after regular cleaning and sterilizing. They must be changed if soiled, wet or worn in long-haul procedures.³

GLOVES

Non-sterilized or procedure gloves, available in small, medium, and large sizes, should be worn all the time by those who come into contact with contaminated material or blood, secretions and fluids.^{2,3} Sterile gloves should be worn by the surgical team for the sake of both their protection against contaminated blood and fluids and the patient's against microorganisms released by the surgical team. Using two overlapping gloves can be recommended for long-haul operations to decrease the risk of loss of continuity, or changing them in procedures longer than

two hours.^{2,3,6} They have variable sizes, between six and eight, and reinforced wrists; they must be sterile, disposable, and can be antiallergic. They must adhere well to facilitate touching and reduce feeling of discomfort in the hands.^{2,3,16,17} They are made of latex or silicone and packaged in left-right pair packs to allow opening the pack and putting them on with the aseptic technique.

CONCLUSION

Surgical attire should be changed in a dressing room located in properly demarcated restricted or semi-restricted areas in SCs. Colors and patterns do not interfere in its main objective, although dark or conspicuous colors may be considered inadequate.

Biosecurity specifications set by the hospital should be followed, and although there is no standard for models, sizes, colors or types of fabric under strict enforcement for preventing nosocomial infections, attire must be worn as long as it is effective in reducing postoperative infection.

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