

## Biological risks in Neurosurgery Operating Theater in Padova: Using the DORO® Headrest System -Teflon™ Coated and DORO® Disposable Headrest Protective Drape

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For many decades, as confirmed by various epidemiological studies, we have become increasingly aware that the hospital environment can encourage the transmission of infections to both patients and healthcare professionals. It is, therefore, of utmost importance to protect the health of patients and healthcare professionals in the hospital environment. The operating theater is one of the environments most at risk for infections, where both patients and healthcare professionals can contract serious illnesses.

There are four categories of agents which can be potentially harmful to health: infection, physical, chemical agents and patient positioning. Microbiological control of the operating theater aims to ensure that procedural norms adopted by healthcare professionals are applied correctly and to evaluate the effectiveness of sanitary procedures used. The main objective is to kill the microbial load in the environment in question. Of course, in the operating theater the people most at risk of infection are the patients, on the other hand, chemical agents pose harm to the healthcare professionals. The possibility of bacterial contamination inside the operating theater is essentially linked to two factors:

- cross-contamination from non sterilized instruments, or poor aseptic technique
- direct or indirect contamination from microbial agents, pathogens, non-pathogens and air dispersed agents

For the topic in question, we will mainly refer to the biological risk of using the Cranial Headrest (Mayfield type) in patients undergoing craniotomy operations. The term Biological Risk refers to exposure to agents which present or could present various levels of risk for human health. The biological agents are classified into 4 groups, based on their level of danger or harm for workers:

**Group 1:** biological agents which have a low probability of causing illnesses in humans

**Group 2:** biological agents with the potential to cause illnesses in humans and posing a risk for workers, but with a low probability of spreading throughout the community due to the effective measures of prophylaxis and treatment.

**Group 3:** biological agents which can cause serious illnesses in humans and posing a serious risk for workers, with the possibility of spreading throughout the community, but with effective measures of prophylaxis and treatment in place.

**Group 4:** biological agents which can cause serious illnesses in humans and posing a serious risk for workers, with a high probability of spreading throughout the community and for which effective measure of prophylaxis and treatment are not available.

### Headrest (Mayfield Type):

One of the most common systems for cranial stabilization in Neurosurgery operating theaters is the Mayfield type Cranial Headrest. In reference to the biological risks described above, the Mayfield Cranial Headrest is a hospital protection device which falls within Group 3 in that the transmission of infective agents harmful for human health can be prevented by following specific procedures. Consisting of two main pieces in steel-aluminum alloy which slide one inside the other, by using single-use skull pins or re-usable skull pins that can be sterilized, the Headrest allows surgeons to stabilize the patient's head for the entire duration of the operation. The steel-aluminum alloy can be cleaned with enzymatic solutions and chlorhexidine-based solutions, but cannot be sterilized in the autoclave.

The new DORO® Teflon™ Coated Headrest System allows the whole surface to be better decontaminated with enzymatic solutions and chlorhexidine-based solutions thanks to its covering. It can then be sterilized in accordance with the manufacturer's instructions. The base unit and the swivel adaptor are also Teflon-coated. These devices connects the Headrest (Skull Clamp) to the operating table. Liquids contaminating the surface of the headrest can be removed by following the procedure described in the instruction manual and following standard decontamination and sterilization procedures in the operating theater. The added value of this device is that the cranial headrest can be sterilized in the autoclave. This headrest



can also be protected from contamination with the DORO® Disposable Headrest Protective Drape, an easy-to-use device which helps save time and energy because it reduces headrest cleaning procedures.

### **Conclusions:**

The safety of healthcare professionals and patients is of utmost importance due to the risks they are confronted with daily. Healthcare professionals, meticulously and carefully following procedures implemented for the prevention or reduction of infection, does not always guarantee satisfactory results. The new DORO® Teflon™ Coated Headrest System described above can guarantee a higher level of cleanliness and a lower risk of infection if sterilization procedures are also followed. Although resistant to strains and mechanical knocks, the Teflon coating can show wear and tear on corners and edges with use. An improved headrest protection can be provided by using the Polyethylene Protective Drape (Latex-free) which is supplied by the same company. This Protective Drape covers the cranial stabilization device completely, therefore reducing contamination from biological liquids in the operating theater. During the test period in our department, the DORO® Teflon-Coated Headrest, because it is black in color did present some difficulties with regards to the visual identification of debris, tissue and biological liquids on the Headrest. We would therefore suggest that the manufacturing company choose a color other than black, which would enable a better visual identification of contaminants. The two protection devices used in our operating theater offer a valid solution to the "old" headrest guaranteeing a higher level of protection against biological risks which form an everyday part of this working environment.



### **Bibliography:**

Centers for Disease Control . Update: Universal Precautions for prevention of transmission of Human Immunodeficiency Virus, Hepatitis B Virus, and Other Bloodborne Pathogens in health care settings. MMWR 1988; 37: 377-82, 387-8.

SIROH Programma italiano di sorveglianza e controllo del rischio occupazionale da HIV ed altri patogeni a trasmissione ematica negli operatori sanitari: selezione della produzione scientifica 1990-1996. Internal Report for the SIROH Coordination Centre, Ospedale L. Spallanzani, Rome, 1996 (pages 1-518).

### **Websites consulted:**

[http://www.infermieredellatiscia.it/PDF/art.rischio.biol\\_nic.torina.pdf](http://www.infermieredellatiscia.it/PDF/art.rischio.biol_nic.torina.pdf) [consulted on 13.08.2009] <http://www.microbiologia.unige.it/dpb/Appunti/M-GENER03.htm> [consulted on 13.08.2009] <http://www.cominox.it/web/faq.htm> [consulted on 13.08.2009]