



ORIGINAL RESEARCH

Surgical Face Mask and N95 Respirator

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Abstract

Differences between N95 respirators and disposable surgical face masks are not always well understood , even by the dental professionals . However , respirators and surgical face masks are very different in intended use, fit against the face, wear time, testing and approval and design . The purpose of this paper is to highlight these differences especially in use for prevention of contacting coronavirus infection.

Keywords: face mask, N95 respirator

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1 | INTRODUCTION

As the Coronavirus is spreading throughout India more & more people get infected with this virus. Since the medical & dental professional have a close contact with the patients, they are also among the group of people who are prone to get infected with coronavirus. Most of the people now know that the use of N95 respirator is one of the methods to prevent the spread of the infection, but they are not aware of the basic difference between N95 respirator & surgical face mask & that's why WHO & CDC has recommended N95 respirator over the disposable surgical face mask. Surgical mask has been used as a method to protect both health workers & patients from respiratory disease since the researchers have discovered that bacteria are present

in nasal & mouth droplets. The primary function of the surgical mask is to prevent the dispersion of the micro-organisms residing in the nasal & mouth of member of the operating team into the open wound of the patient'. As science developed new material, design, & their filtering efficiency gradually improved.

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2 | DIFFERENCES BETWEEN SURGICAL FACE MASK & N95 RESPIRATOR

DEFINITIONS

FACE Mask² (Figure 1) - unless otherwise specified the term face mask refers to a disposable face mask cleared by U.S. food & drug administration (FDA) for use as a medical device. This includes face masks labeled as surgical, medical, dental or laser mask.



FIGURE 1: Surgicalface mask

Types of a face mask:

- 1) Flat/ pleated or duck billed in shape which can be affixed to the head of the wearer with 2 ties & conform to the face with the flexible adjustment for the nose bridge;
- 2) Pre-moulded, adheres to the head with a single elastic band & has a flexible adjustment for the nose bridge;
- 3) Flat & pleated & affixed to the head with ear loops.

RESPIRATOR ²(Figure 2)— unless otherwise specified the term refers to an N95 or higher filtering face piece respirator certified by the CDC/ national institute of occupational safety & health (NIOSH). N95 respirator is able to filter 95% of the oil free microscopic particles & it is not oil proof.

USE

The biggest difference between N95 respirator & surgical mask is the intended use. Respirators are



FIGURE 2: N95 Respirator

designed to reduce the wearer’s respiratory exposure to the air born contaminates e.g. particles, gases, vapours. N95 respirator reduces the exposure of small particles [molds, bacillus anthracis, mycobacterium tuberculosis, & the coronavirus] that are small enough to be inhaled³. Surgical masks do not have sufficient filtering & fitting properties to provide respiratory protection to the wearer from coronavirus since it is designed to prevent contamination of the surrounding working environment & the sterile surgical field from large particles generated by the wearer e.g. saliva & mucous. Surgical mask may also be used to reduce the risk splashes of blood & any other body fluid from reaching the surgeon’s mouth.

FIT

Proper fit conforming to the face is a very important differentiating factor. N95 respirators are designed to seal the face of the person, so most of the inhaled air will pass through the filters of the respirator & not through the gap between the respirator & face. Surgical masks are not designed to seal against the face & are not fit tested because the mask is designed to capture large particles exhaled by the wearer& to help reduce the wearer’s exposure to the splashes. During inhalation most of the air passes through the gap between the mask & face instead of the filtering layers of the face mask.

WEARING TIME

Respirators are designed to be worn when a person comes in close contact with infected patients or he/she is going to a contaminated field, on the other hand a surgical mask is frequently worn for specific procedures & then removed after the completion of the procedure.

3 | TESTING & CERTIFICATION

Respirators & masks substantially differ on the basis of testing & certification. Respirators must be tested & cleared by the National Institute of Occupational Safety & Health (NIOSH) to ensure adequate performance in the work place². Those that are approved must have NIOSH & filter classification printed on them. Food & Drug Administration (FDA) does not directly test the surgical mask; rather the manufacturer provides data to the FDA which reviews manufacturer's test data & clears the mask for sale. Tests include particle filtration efficiency (PFE), bacterial filtration efficiency, fluid resistance, flammability testing etc³. The PFE test is a quality indicator for surgical mask & is not an indicator of respiratory protection performance. It is not comparable to the government mandate filtration testing required for NIOSH approved respirator e.g. N95 respirator.

RISK

Persons with chronic respiratory disease, cardiac problem, or any other condition that make it hard to breathe may have difficulty in breathing through the respirator. It is not advocated for children & persons with facial hair². No such problems exist with the face mask.

DESIGN

N95 respirator is made up of three layers. Outer layer is made of polyester fabric. Middle layer (filter media) is made of melt brown (polypropylene) fabric that blocks 95% of particulates. Inner layer is made of polypropylene fabric that is hypoallergenic &

comfortable against the face⁴.

Surgical face mask is provided with inner layer of soft polymeric foam material which is worn against the face. Soft foam material readily absorb the perspiration & saliva & passes these fluid to middle filter layer, thereby maintaining the layer adjacent to face soft & dry. Mask include an intermediate layer of filter material & outer layer of nonwoven material.

4 | CONCLUSION

Surgical mask cannot provide protection against coronavirus and it acts only as a barrier between the surgeon and surgical field. Surgical mask also helps to restrict the spit and mucous of the surgeon from reaching the patient and surgical instrument. However if anyone wants protection of inhalation of small particles like virus he/she should use a NIOSH-certified respirator. (1–3) (4)

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