

**STUDY OF LAYERING ORDER ON FILTRATION ABILITY
OF SURGICAL FACE MASKS**

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ABSTRACT

Health care workers can be exposed to biological aerosols capable of transmitting disease during normal daily activities. Attention is placed on reducing the potential of airborne exposure through the use of surgical face masks. Although nonwoven manufactures have shown much interest in the layering order of the surgical face masks, there are no published papers about the effect of layering order on the filtration ability of surgical face masks. In evaluating the effect of layering order on filtration ability of surgical face masks, Laser Scanning Confocal Microscopy (LSCM) cross sectional examination technique was used to determine particle capture. The transmission of small particles through the cross section of the surgical face mask was examined using LSCM. In each of three face masks examined, the filtration layer stopped the penetration of small particles through face masks no matter whether the filtration is the second layer of a three-layer face mask or the second layer of a four-layer face mask or the third layer of a four-layer face mask. Although layering order varied in this study, the filtration layer always stopped the penetration of the small particles. Therefore, layering order did not affect the filtration ability of the surgical face mask greatly.

Keywords: Filtration, Nonwovens, Surgical Face Mask, Layering Order

INTRODUCTION

Health care workers, involved in treating and caring for injured or sick individuals, can be exposed to biological aerosols capable of transmitting disease. These diseases can pose significant risks to life and health. Since engineering controls can not eliminate all possible exposures, attention is placed on reducing the potential of airborne exposure through the use of medical face masks. [1]

Although there are a variety of surgical face mask styles currently in the

market, the layered face mask is one of the most common types. Within the available layered face masks, there are a variety of different layering orders. Some of the masks have three layers, and the filtration layer, the layer with the high packing density, is between the outside cover layer and the inner shell layer. Others have four layers and the position of filtration layer changes in the layer arrangement of the four-ply face mask. The filtration layer may be behind the outside cover layer or proceed the inner shell layer. Although nonwoven manufactures have shown much interest [2] in the layering order, there are no published