

عنوان مقاله:

The Effect of Decontamination Methods on the Functionality of N⁹⁵ Respirators in Particle Removal and SARS-CoV-² Eradication

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خلاصه مقاله:

Background: During the early days of COVID-¹⁹ pandemic, due to the shortage of N⁹⁵ respirators in hospitals and healthcare centers, the reuse of N⁹⁵ respirators was posed as a crisis capacity strategy. Several studies have evaluated the efficacy of various decontamination methods on N⁹⁵ respirators of well-known and approved brands. However, fundamental question is whether decontamination and reuse methods can be applied to all types of respirators. **Methods:** Six types of respirators were selected from well-known and lesser-known brands which their manufacturers claimed to be N⁹⁵. The selected respirators decontaminated with dry heat, ultraviolet germicidal irradiation, and ethylene oxide methods in seven consecutive cycles and their particle filtration efficiency and pressure drop were measured before and after each decontamination cycle. **Results:** As the initial measurements revealed, 4 respirators (group A) showed a sharp drop in efficiency and also, negative efficiency in removing 2.5 and 4 μm particles in most of the experiments. In these respirators (group A), the maximum efficiency in removing 0.5 μm particles was 74.4 %, while the last two respirators (group B) achieved an efficiency of 98 %. Subsequent experiments following the decontamination process revealed that the non-authentic N⁹⁵ respirators within group A which were not resistant to decontamination. However, the second group demonstrated a removal rate of over 95 % of particles ranging from 0.5 to 10 μm after six consecutive decontamination cycles using all three methods. The results demonstrated that ultraviolet germicidal irradiation and ethylene oxide methods could eradicate the covid-¹⁹ virus from respirators. **Conclusion:** The results indicated that decontamination can be successfully applied to original N⁹⁵ respirators, not low-quality respirators, even under critical conditions.

کلمات کلیدی:

SARS-CoV-², Respirator, Decontamination, Particle, N⁹⁵

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