

Abstract

Filtration efficiency of the ramathibodi nasal filter evaluated by rhinomanometry in high concentration level of laser smoke particle.

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Under conditions with a high concentration level of laser smoke particles, the filtration efficiency of the Ramathibodi nasal filter was studied. Different kinds of filter material in the Ramathibodi nasal filter were evaluated in human adults with an anterior standard rhinomanometric method. The Ramathibodi nasal filter with three-layers of a half-face mask filter and a 4 mm thickness polyurethane foam put inside was applied in a simulated human airway. The experiment was conducted in the Otolaryngology Department, Ramathibodi Hospital from October to December 2001. The amount and size of laser smoke particles were measured by a laser diode portable dust monitor. The amount of residual laser smoke particles in the simulated human airway without the Ramathibodi nasal filter of PM_{2.5}, PM₁₀ and PM₁₅ were 100.91 +/- 7.65, 109.10 +/- 7.87 and 120.18 +/- 14.28 mcg/m³ respectively. The amount of residual laser smoke particles in the simulated human airway with the Ramathibodi nasal filter of PM_{2.5}, PM₁₀ and PM₁₅ were 85.55 +/- 3.42, 92.18 +/- 4.40 and 99.72 +/- 5.02 mcg/m³ respectively. The filtration efficacy of the Ramathibodi nasal filter showed a high statistically significant difference with a p-value of <0.001 for three particle sizes. High concentration of laser smoke particles in an operative room represented suspended particulate matters which are very dangerous for human healths. The Ramathibodi nasal filter as a personal respiratory protective device applied in human nasal vestibules could protect the human airway from atmospheric suspended particulate matter.