

## **Effect of a tracheostomy speaking valve on secretions, arterial oxygenation, and olfaction: a quantitative evaluation.**

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### **Abstract:**

Tracheostomy speaking valves consist of a one-way valve that closes upon exhalation, causing a redirection of exhaled gas into the upper airway, thus allowing for the primary benefit of speech. The present study was undertaken to test various hypotheses concerning the secondary benefits of speaking valves. We hypothesized that use of a speaking valve will result in a decrease in accumulated secretions, an increase in arterial oxygenation and an improvement in olfactory function. A total of 8 tracheotomized patients met the following inclusion criteria: age > 18; ability to tolerate wearing a speaking valve for at least 3 hours; no unstable medical conditions; no use of thrombolytic agents. While using the speaking valve patients accumulated fewer secretions (74.3 +/- 63.6 vs. 122.8 +/- 44.6 ml/day,  $p = 0.004$ ,  $n = 7$ ) and had improved olfactory function (accuracy = 28.4 +/- 5.2 vs 8.1 +/- 2.9%,  $p = 0.02$ ; and percent correct = 64.2 +/- 2.6 vs 50.0 +/- 3.9%,  $p = 0.03$ ,  $n = 6$ ) than when off the speaking valve. No significant differences were found in 24-hour arterial oxygen saturation (pulse oximetry and ABG analysis respectively,  $n = 7$ ), arterial PO<sub>2</sub>, pH, PCO<sub>2</sub>, HCO<sub>3</sub>, or 24-hour heart rate ( $n = 7$ ). Thus, the present study found a significant decrease in secretions and improvements in olfaction when tracheotomized patients wore a speaking valve, but no difference in arterial oxygenation.