



Respiratory and Ventilatory Effects of the TASER on Human Subjects

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Introduction: The National Institute of Justice reports that 9800 United States law enforcement agencies currently authorize the TASER device which is being carried by over 225,000 officers. Additionally, they report that over 120,000 U.S. citizens also have a TASER device. Although the actual number of uses is unknown, it has been reported that the TASER has been used on over 150,000 volunteers during training and in over 100,000 "real-life" police confrontations. Although generally regarded as safe and approved by the U.S. Consumer Product Safety Commission, controversy has arisen because of the sudden deaths of individuals that have occurred after the deployment of the TASER. Concern has focused on the potential impact on cardiac and respiratory function. Studies on these effects in humans, however, is limited.

Objectives: The purpose of this study was to examine the effects of a single Taser exposure on respiratory and ventilatory function in human subjects.



Methods: We conducted a prospective experimental clinical study on human volunteers receiving a 5 second TASER X-26 activation as part of law enforcement training. Respiratory and ventilatory measurements including tidal volume (TV), respiratory rate (RR), and minute ventilation (VE), end-tidal CO₂ (etCO₂) and transcutaneous pulse oximetry (SaO₂) were measured at baseline and 1, 10, 30, and 60 minutes after TASER discharge. Confirmatory arterialized capillary samples were obtained at baseline, 1, 10, 30, and 60 minutes after TASER discharge.

Data were analyzed using repeated measures ANOVA (alpha=0.05) with 95% CI reported (SPSS). Clinical significance was defined a priori as evidence of hypoxemia (SaO₂<95%) or hypoventilation (etCO₂>45 mmHg).

Results: Data were collected on 28 men and women law enforcement officers (38.4 ± 7.7 yr; 196.8 ± 33.1 lbs). Measures of pulmonary and ventilatory function were different overall (p<0.05). Mean VE, TV, and RR all increased at 1 minutes after TASER discharge, and returned to baseline levels at 10, 30 and 60 minutes. There were no differences in SaO₂, pO₂, etCO₂, or pCO₂ between baseline and subsequent post-TASER measures at 1, 10, 30 or 60 minutes. In addition, there was no evidence of abnormal hypoxemia or hypoventilation.

Effects of TASER Exposure on Respiratory and Ventilatory Parameters (n=28)					
Measure	Baseline Mean (SD)	1-Min Mean (SD)	10-Min Mean (SD)	30-Min Mean (SD)	60-Min Mean (SD)
VE (L/min)	15.9 (4.2)	26.5 (7.8)*	17.9 (4.2)	16.0 (5.7)	15.3 (4.1)
TV (L/breath)	0.87 (0.26)	1.26 (0.60)*	0.91 (0.27)	0.90 (0.36)	0.84 (0.27)
RR (breaths/min)	18.8 (4.1)	22.9 (5.3)*	20.5 (4.6)	18.7 (4.5)	18.6 (3.7)
O ₂ sat (%)	97.6 (1.3)	97.8 (1.0)	97.5 (1.4)	97.1 (1.2)	97.3 (1.2)
etCO ₂ (mmHg)	33.5 (2.9)	34.5 (4.4)	33.5 (3.0)	32.8 (2.6)	33.1 (2.0)

*Repeated Measures ANOVA <0.05

Limitations: Our subjects were generally healthy and free from chronic disease. The duration of the TASER activation in our study did not exceed a single 5 second activation. Our subjects were also not under the influence of illicit stimulant drugs, or in a state of excited or agitated delirium, that often occurs in the field setting.

Conclusions: In our healthy human study subjects, there was evidence of hyperventilation immediately following a TASER discharge, but no lasting changes in pulmonary or ventilatory function. In addition, there was no evidence of hypoxemia, hypercapnea or hypoventilation throughout the 60 minute study period following a TASER discharge.



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