

# Physiologic Effects of Prolonged Conducted Electrical Weapon Discharge On Acidotic Adults

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## INTRODUCTION:

Conducted electrical weapon (CEW) use by law enforcement is growing. There are societal concerns about the safety of CEWs and their possible role in causing death related to worsening metabolic acidosis.

Previous CEW work indicates a high degree of safety but has only been done on rested subjects which may not simulate reality. It is thought that CEW field use often involves application to acidotic subjects and more than a single application.

We examine the physiologic effect of prolonged CEW use on acidotic humans.

## METHODS:

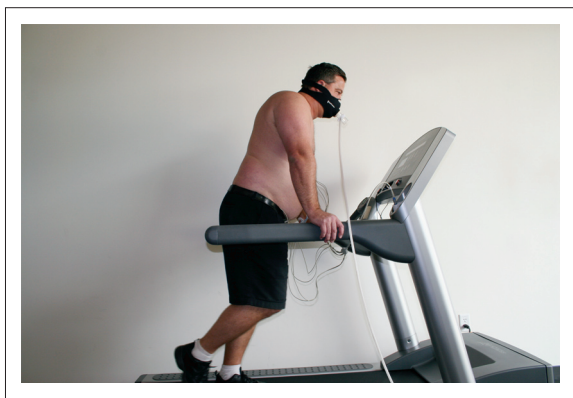
Human subjects underwent monitoring after an anaerobic exercise regimen which included a timed push-up event and a run on a treadmill at 8.5 degrees of elevation at 8 mph to ensure anaerobic exhaustion. This was followed by a 15 second CEW application. Venous blood was collected before and after exercise to verify acidosis and again after CEW exposure to evaluate effect.

A control sample that exercised but underwent additional 15 seconds of exercise was also included for comparison. Samples were analyzed for markers of cardiac muscle injury and acidosis. Data were analyzed using descriptive statistics.

## CONCLUSIONS:

Markers of acidosis and cardiac injury were similar among acidotic subjects who underwent both continued exertion or prolonged CEW exposure.

Prolonged CEW exposure in humans does not appear to have an effect with regard to worsening acidosis that is already present.



## RESULTS:

n=44 (43 males, 1 female), mean age 39.2 years (+ 6.8, range 29 to 53) There were 38 CEW exposures and 6 controls.

In both CEW exposure and control populations after initial induced acidosis:

\*A similar decrease in pH after exercise in both the controls (17.4%, 95% CI=0.7 to 34.1) and the exposed subjects 14.9%, 95% CI=12.5 to 17.5) was found.

In both CEW exposure and control populations, following their respective 15 second periods of either CEW exposure or continued exercise, there was:

\*A similar increase in pCO<sub>2</sub> (28.9%, 95% CI=7.5 to 50.2 in controls vs. 13.5%, 95% CI= 6.0 to 20.9 in exposed) occurred.

\*A similar increase in PO<sub>2</sub> (44.9%, 95% CI 18.8 to 30.9 in controls vs. 21.8%, 95% CI=7.0 to 36.7 in exposed) occurred.

\*Similar increases in serum lactate (7.7, 95% CI=-0.9 to 16.2 in controls vs. 7.5, 95% CI=6.5 to 8.6 in exposed) were found.

\*All troponin I levels were <0.3 ng/mL.

