

## Advanced taser: neurophysiological aspects

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### Title:

Advanced Taser: neurophysiological aspects

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### Abstract:

The investigation aimed at the elaboration of technical, medical and scientific arguments to help the Army Headquarters to choose in the future a non-lethal weapon for the equipment of the French Armed forces.

Twelve 45-kg pigs were instrumented for polygraphic (electrocorticogram ou ECoG, electromyogram ou EMG, electrocardiogram ou ECG) recordings under anesthesia (azaperone 2 mg.kg<sup>-1</sup>) and analgesia (fentanyl 50 µg).

Once the polygraphic signals had reached stability, recordings were taken before (20 min) and after (20 min) "taserization". The animals were euthanized at the end of the day and biological samples taken. Two types of effects were observed : incapacitant and vulnerant effects. Incapacitation was increased as shown by the elevated delta activity on the ECoG. This increase indicated a reduction of the level of vigilance immediately after taserization. The power spectrum of the ECoG was also reduced in the theta band, characteristic of activated mental states, indicating an incapacitant and/or vulnerant effect. The absence of variation in the gamma band was attributed to the anesthesia. The effects on the ECoG lasted 10 to 19 min. Although the ECG recordings did not show any effect on heart rate or on the ECG trace, a 30 % decrease in power spectrum of the ECG lasting 10 to 20 min indicated a drop in myocardium contractility power. Such a reaction may prove to be deleterious for disabled or fragile people. The vulnerant effect was also documented by the death of one animal after taserization.

In conclusion, the technique used allowed the objective determination of the incapacitant and vulnerant effects of Advanced Taser and, according with the literature, evidenced the danger represented by such weapons if they are used on debilitated persons.

### Keywords

Taser, Non Lethal Weapon, Stun guns, electrical incapacitation.