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Case report

# A brain penetration after Taser injury: Controversies regarding Taser gun safety

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ABSTRACT

We report the case of a 27 year old man who was injured by a Taser gun device which penetrated the frontal part of the skull and damaged the underlying frontal lobe. Cerebral penetration was revealed by a brain CT scan. A neurosurgical procedure was required to remove the dart from the skull and brain and the evolution was successful allowing discharge of the patient one week later. There were no additional lesions, particularly electrifying lesion, as only one probe had penetrated the skull.

We also observed the length of a Taser dart is sufficient to allow brain penetration.

Fortunately, no infection or neurological complication occurred following brain injury.

This case study underlines the potential risk induced by the use of Taser stun gun. Although generally regarded as a safe alternative, serious injuries have however been reported and questions regarding the safety of the device still remains unresolved.



## 1. Introduction

The Taser stun gun is a weapon that was introduced in 1974 to temporarily incapacitate aggressive and uncontrollable persons by delivering a direct-current type of shock via two barbed darts. The Taser affects neuromuscular transmission and its aim is to penetrate and tetanize skeletal muscles in order to induce muscular contractions that lead to a fall.

The interest of using the device resides in the fact that the risk of injury after its use seems to be lower compared to the utilization of a traditional lethal stun gun. Therefore, in theory, the Taser gun should be a less lethal weapon than a hand gun with reduced mortality.

However, some injuries have been previously reported which essentially are injuries linked to the mechanical effect of Taser darts, traumatic lesions due to falls and visceral dysfunction induced by physical electrical effects (as cardiac disrythmia) [1,2].

## 2. Case report

A 27 old man was immobilized by the police while he struggled with a police officer during an identification check and attempted an escape. He had a high level of alcohol at the time of the arrest. A X26 Taser was used to incapacitate and subdue the victim.

No immediate medical examination was subsequently performed in the patient after the wires were propelled and he was allowed to return home. However, because he complained of a headache, he decided to go to the nearest hospital a few hours later.

Upon presentation at the Emergency Department the patient was conscious. The examination revealed a harpoon-like barbed electrode dart implanted in the right frontal part of the skull and a right peri-orbital bruise. Bruises were observed as well on the anterior side of knees because the patient had fallen on both knees. No cardio-vascular or neurological disorder was observed and the blood alcohol content was 1.8 g/L.

The examination did not permit to discover any another injury induced by the second dart. It is possible that the other probe had been implanted in the clothes without contact with skin.

The patient was transferred to a neurosurgical unit for surgical management. A number of bruises that were observed in right orbital area could have been due to cranial and encephalic damage. The patient had a Glasgow Score of 15 and the neurological examination showed no distinctive feature with normal motor, sensory and deep tendon reflexes.

X-rays of the skull confirmed that the probe was in fact implanted in the right area of the frontal zone (Figs. 1 and 2).

The brain CT scan revealed an encephalic injury in the right area of the frontal lobe (Figs. 3 and 4). In fact, the probe was implanted in the frontal area of the skull and then in the right frontal cortex with a penetration depth of a few millimeters. The day following the injury, a neurosurgical procedure was performed to remove the dart (Fig. 5). The procedure confirmed a penetration of the dura mater and the probe penetration in the frontal parenchyma with a minor hemorrhage near the tip of the probe. In fact, the probe was inserted into the lateral right side of the frontal bone, above the frontal eminence, in the squama frontalis which is a smooth

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**Fig. 1.** A Taser probe is located in the right frontal area of the skull (face incidence).

convex surface. The CT scan showed squama of 5.6 mm in thickness in our patient. Therefore, the probe penetrated the galea aponeurotica, the outer table, the inner table, the dura mater and 2 mm into the frontal lobe.

Later, no neurological deficiency or infectious symptoms, particularly meningitis, were discovered during the physical examination.

Because the second dart propelled by the Taser gun had not injured the patient, no electric shock occurred. The second probe probably penetrated only the jacket worn by the man because a thin hole was observed in the cloth located in the upper right area of the chest, with no adjacent cutaneous injury. Moreover, a blasting noise was heard during the screening of the Taser gun videos which demonstrated the presence of a open circuit and confirmed that only one probe had penetrated the individual. The conclusion was that only one barbed dart had struck the individual in the skull.

Later, the patient did not suffer from either an epileptic seizure or other neurologic complications for more than 5 months. Nevertheless, he continued to experience persistent frontal throbbing headaches during physical efforts and head movements in ante-flexion that lasted about two hours but only rarely occurred (an average of two occurrences per month). No headache had been reported before the brain injury, as well as no previous medical history.

In addition, the young man complained of diurnal ruminations and sleep disorders that were more relevant during the first months after the injury. Symptoms of anxiety, difficulties in

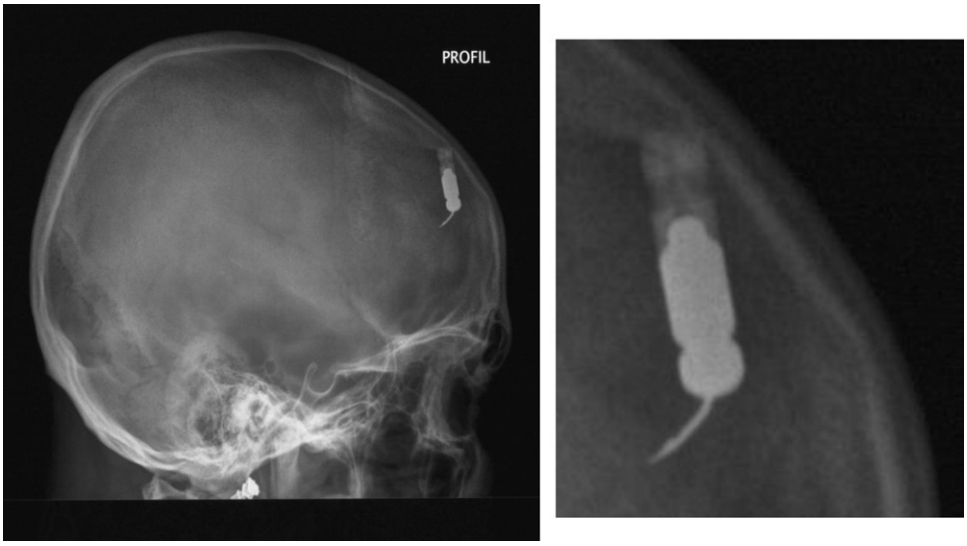


**Fig. 2.** A Taser probe is observed in the right frontal area of the skull (profile incidence).