



## Recommendations

# Taser®: Clinical Effects and Management of Those Subjected to Taser® Discharge

The medico-legal guidelines and recommendations published by the Faculty are for general information only. Appropriate specific advice should be sought from your medical defence organisation or professional association. The Faculty has one or more senior representatives of the MDOs on its Board, but for the avoidance of doubt, endorsement of the medico-legal guidelines or recommendations published by the Faculty has not been sought from any of the medical defence organisations.

## Introduction

### Taser® background, clinical effects and management

#### Background

The Taser® X26 is a battery-operated conducted energy device currently approved for use by police forces in the UK. The device is one of several 'less-than-lethal' options available to the police which enable them to manage violent and aggressive people and those with other forms of acute behavioural disturbance. Other options include CS and PAVA irritant sprays, handheld batons and physical restraint.

When the trigger of the Taser® X26 is pressed and released, the device generates a default 5-second train of very short electrical pulses, with each pulse lasting about 0.1 milliseconds. These pulses are produced at a rate of about 19 per second. If necessary, additional 5-second pulse trains may be delivered by pressing (and releasing) the trigger more than once. If the trigger is depressed continuously, the Taser X26® will generate pulses until the battery is depleted.

The pulses produced by the Taser® X26 may be applied in two main ways, termed *probe mode* and *drive-stun mode*. In probe mode, two metal barbs are fired from the front of the device. These barbs, which remain electrically connected to the handset by fine wires and are each about 10 millimetres long, attach to the clothing or skin of the targeted person.

In drive-stun mode, the two electrodes on the front of the handset are applied directly to the person's skin or clothing.

The barb used in the Taser® X26 cartridge is shown below:



In the UK, the overwhelming majority of police uses involving discharge of the Taser® X26 occur in probe mode.

#### Clinical effects

The effect that the pulses produce depends on the mode of use. In drive-stun mode, the primary effect is the production of localised pain due to the electrical stimulation of nociceptive afferents between the two handset electrodes. In probe mode, the wider separation of the barbs produces a combination of intense generalised pain and muscle contraction, the latter effect generally precluding any voluntary, coordinated muscular activity by the targeted person.

The range of clinical effects of the Taser® X26 has recently been reviewed by the UK government's independent advisory committee on the medical implications of less-lethal weapons (DOMILL, 2012).

Clinical effects that have been associated with the application of Taser® discharge include:

- Localised superficial burns and erythema arising from the passage of electrical current through the skin.
- Barb penetration injury which, in rare instances, may involve deeper-lying tissue. (Pleural, brain and eye penetration injuries have been reported.)
- Musculoskeletal injury from the intense muscle contraction. (Spinal compression fractures have been reported.)
- Bony injuries from Taser®-induced falls (including fatal head injury).
- Triggering of epileptic seizures.
- Cardiac effects (see below).

Although earlier human studies indicated that Taser® discharge in probe mode does not adversely affect breathing, a recent study suggests that inspiratory activity may be severely compromised (VanMeenen et al., 2013).

The circumstances in which the police use Taser® devices (and other 'less-than-lethal' methods of restraint) are likely to be physically and emotionally charged. This in itself has the potential to precipitate adverse cardiac or cerebrovascular events in individuals suffering from clinically diagnosed or subclinical cardiovascular disease. Alcohol, illicit drugs and mental health conditions (including drugs prescribed to treat those conditions) all have the potential to increase the risk to individuals, even in the absence of Taser® use.

A continuing source of controversy concerns whether the electrical discharge from the

Taser® X26, when applied to the anterior chest through a barb that has embedded in the skin or clothing overlying the heart, can directly affect heart rhythm (Zipes, 2012). A single human volunteer study using a new type of conducted energy device demonstrated that it is possible to induce rapid ventricular capture in this way (Ho et al, 2011). On the basis of this study, the government's independent advisory committee on the medical implications of less-lethal weapons took the view that it would be prudent to assume that the same effect could arise with the Taser® X26 (DOMILL, 2012).

Should rapid ventricular capture occur in a young, healthy individual, it is likely to revert to sinus rhythm as soon as the Taser® discharge ceases. The consequences of ventricular capture may be more sinister in people with diseased hearts or who have taken illicit or prescription drugs having intrinsic effects on cardiac electrophysiology or coronary perfusion (DOMILL, 2012).

Further controversy surrounds the effects of Taser® discharge on the unborn child. Risk could conceivably arise from a direct effect of the Taser® discharge current or could be secondary to other effects such as discharge-induced falls (DOMILL, 2012).

Information on the medical effects of Tasers® is provided by the manufacturer of the devices (Taser, 2013).

## Management

### Advice to Custody Officers and other Officers

An individual who has been subjected to Taser® discharge should be assessed at the earliest opportunity by a healthcare professional (eg doctor, nurse or paramedic). Prior to this, appropriate first aid or resuscitation procedures should be administered whilst awaiting healthcare assessment. Healthcare advice may need to be sought urgently by phone. If there are any signs of adverse or unusual medical reactions then medical assistance should be provided immediately. A Forensic Physician must be called to certify fitness to detain and to document any effects of the Taser® discharge. If an individual is in hospital, a Forensic Physician should assess that person at the hospital. Police officers should be mindful that the barbs might be used to self-harm or as a weapon against them. Therefore, consideration should be given, if barbs are left in the body, to handcuffing the subject. Taking the above considerations into account, the Custody Officer should conduct an appropriate risk assessment prior to placing the subject in a cell.

If the barbs are located in the person's clothing and have not penetrated the skin, police personnel may remove them. Officers and others must be aware that when barbs are removed from a subject's body, the barbs will become a biohazard and the officer will need to take appropriate precautions both during and after the removal. The barbs should be retained and exhibited. Custody Officers and other officers need to be aware of the circumstances of Taser® use to inform any healthcare professional. In particular, injuries sustained when subjects fall to the ground, especially injuries to the head, may not be apparent immediately. Close monitoring of a subject

throughout the period of detention prior to and subsequent to healthcare assessment is of the utmost importance and should be provided with the same level of supervision for prisoners intoxicated with alcohol or drugs. The Custody Officer will ensure that the subject is provided with *Advice to those who have been subjected to Taser® discharge* information as soon as practicable.

### Advice to Healthcare Professionals

All persons subjected to Taser® discharge must ultimately be examined and assessed by a registered medical practitioner – a doctor – (eg Forensic Physician or Emergency Department doctor) who is familiar with the nature of Taser®-associated risks and complications. If the doctor is unfamiliar with these unique risks and complications, he or she must be provided with a copy of these recommendations to inform them.

In most cases, initial first aid or barb removal (if not already done) may be undertaken by any appropriate healthcare professional (eg nurse or paramedic) and, where barbs have not penetrated the skin, by police officers. Barbs that have penetrated the skin may be removed by stabilising the skin surrounding the Taser® barb and, while firmly grasping the barb, removing it with rapid traction.

Where barbs have penetrated or are adjacent to sensitive and/or high risk areas, such as the eyes, ears, nose, mouth, face, neck, genitalia, spine, hands, feet or joints, doctors should use their clinical judgment and if necessary, seek specialist advice on barb removal.

A full history must be taken documenting any specific health conditions (eg cardiac arrhythmias, pacemaker, drug or alcohol use, epilepsy, diabetes), the nature of the Taser® deployment and any other form of restraint used (from officers involved in the deployment) and identifying any specific symptoms reported by the subject during or following the use of the Taser®.

A full external examination (including documentation and assessment of site of barb penetration) to document visible injury and a full cardiovascular, respiratory, musculoskeletal and neurological examination should be undertaken to identify or exclude any Taser®-associated complications.

The potential effects of Taser® discharge on the fetus are unknown, and pregnant women should be referred for specialist obstetric review.

All those subjected to Taser® discharge must be advised to attend their GP or Emergency Department if they have any subsequent concerns. Electrocardiography, X-ray, ultrasound, CT or MRI scans may be indicated dependent on the medical assessment. If head injury has been sustained, the UK Faculty of Forensic and Legal Medicine has produced advice on the evaluation and management of head injury in persons held in police detention. <http://fflm.ac.uk/librarydetail/4000036>

It is unlikely that the Taser® would have been used in isolation from other forms of restraint. Concurrent injuries or effects arising from police use of other forms of force should also be considered during assessment of the patient. <http://fflm.ac.uk/librarydetail/4000100>

## References

DOMILL (2012). Defence Scientific Advisory Council Sub-Committee on the Medical Implications of Less-Lethal Weapons: Statement on the Medical Implications of Use of the Taser X26 and M26 Less-Lethal Systems on Children and Vulnerable Adults.

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Taser (2013). TASER® Handheld CEW. Warnings, Instructions, and Information: Law Enforcement. <http://www.taser.com/images/resources-and-legal/product-warnings/downloads/law-enforcement-warnings.pdf>

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## Advice to those who have been subjected to Taser® discharge

You have been subjected to the effects of a Taser®. The Taser® passed short pulses of electricity into your body. The electricity made your muscles contract (go stiff). You may well have lost balance and fallen to the ground.

The device was used by a specially trained police officer.

During, or shortly after the use of the Taser®, you may have experienced some symptoms, which may include:

- Being dazed for several minutes;
- Muscle twitches;
- Loss of memory of the event;
- Unsteadiness and a spinning sensation;
- Temporary tingling;
- Weakness in the limbs;
- Local aches and pains and tissue swelling.

These sensations are normal effects of the Taser®.

You will have been examined by a doctor whilst in custody who will have looked for any adverse effects of Taser® discharge. If any of these effects are still present a day later, or you have any other symptoms or injuries that were not present before the Taser® discharge, you must attend your GP or local Emergency Department.

You may have two small marks (similar to bee stings) in your skin. These are small puncture wounds from the short needles (barbs) through which the electric current passed into your skin. These barbs will have been removed whilst you are in custody. There may be small burns similar to sunburn around these marks. These should return to normal in a few days. If they do not and there is pain and swelling, you may have a local infection – see a doctor. If the probes only stuck in your clothing, you may still have two small areas of skin underneath that look sunburned.

There are no known effects of the Taser® on the well-being of the unborn child. However, if you are pregnant and have been subjected to Taser® discharge it is advisable to be reviewed by your doctor or midwife.