

TASER TECHNOLOGY

Greater safety for officers and suspects



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The use of the TASER has come under scrutiny in the past several years by the American Civil Liberties Union and other human rights organizations alleging it is inhumane. It appears human rights groups would rather a police officer shoot and kill a suspect rather than save their lives. Anytime a new instrument is offered to police, human rights groups claim the device is inhuman. When pepper spray was introduced to police, it received scrutiny from these groups as well. There are articles in newspapers and newscasts on television everyday concerning the TASER, questioning if it should have been used under the circumstances. Police administrators and supervisors look at each incident and ask themselves, "Was the TASER deployed appropriately and within policy?" The Bentonville Police Department's policy regarding the use of the TASER has been changed twice in three years because of law suits and media coverage nationwide. Our policy has become more restrictive due to the aforementioned issues. The intention of this paper is to explain the effectiveness and safety of the TASER, not only to suspects but to officers as well. I will discuss the history, medical concerns, decreased officer/suspect injuries and the future of the TASER.

TASER History

The word "TASER" is an acronym for, "Thomas A. Swift Electric Rifle." Tom Swift is the young protagonist in several series of juvenile adventure novels starting in the early twentieth century and continuing to the present. Jack Cover was the creator of the TASER during 1966-1974. Cover was a NASA scientist, and began researching the development of less-lethal weapons at the time when President Johnson called for this research. It was revealed that short duration, high energy, predominately direct current (D.C.) pulses were non-lethal and non-injurious, and had an intense physiological and psychological effect upon both human and animal test subjects. These tests were done under the supervision of Doctor Frank Summers with two cardiologists, a physiologist, EKG and other instrumentation at St. Joseph's Hospital in Orange County, California (TASER Instructor Manual p.19).

TASER International was founded in Phoenix, Arizona in 1993. The first TASER developed was a 7-watt AIR TASER. The AIR TASER was sold to citizens from 1994-2003. TASER researchers between 1994 and 1999 learned that the 7-watt stun

systems were not sufficiently effective to stop focused combative aggressors. TASER began animal testing in 1996 that lead to the development of 26 watt Electro-Muscular Disruption (EMD) technology. EMD technology was first introduced in 1999 with the ADVANCED TASER M26, the first non-lethal weapon capable of stopping focused aggressors by overriding the central nervous system. The M26 also introduced the concept of the data port to track the usage of the weapon. In 2002, TASER International conducted further studies to refine the EMD waveforms. The result is Shaped Pulse Technology, complex waveforms that achieve the EMD effect at much lower power levels than the M26. In 2003, the first Shaped Pulse weapon, the TASER X26 was introduced. Advanced Shaped Pulse Technology makes the X26 five percent more powerful than the M26, yet 60% smaller and lighter (TASER Instructor Manual p.19). During the beginning of TASER International, their weapon system was categorized as less-lethal, but due to lawsuits and human rights groups they quickly categorized the system as non-lethal.

Medical Concerns

The TASER can be deployed two ways. The first is the "drive stun", in which the officer places the end of the TASER directly onto the suspect's clothing or skin with or without the cartridge, which holds the probes. If the cartridge is attached and an officer "drive stuns" a subject the blast doors will not open, thus not allowing the probes to deploy. The drive stun method is used for pain compliance. The second way to deploy the TASER is by shooting two probes from the TASER that are linked to the TASER by copper wires. The Taser cartridges with probes are produced with a fifteen, twenty-one, and twenty-five foot range. The probes cause Electro-Muscular Disruption (EMD), or simply put, the TASER jams the nervous system. The human nervous system communicates with simple electrical impulses. The TASER technology uses similar electrical impulses called TASER-Waves. These conducted energy weapons stun and override the central nervous system causing uncontrollable contractions of the muscle tissue. The M26 and X26 TASERS affect both sensory and motor nervous systems, incapacitating the suspect (TASER Instructor Manual p.17). The TASER is probably the most safe non-lethal weapon system that police have at their

disposal. The TASER actually has a very low amount of Amps. To put this into prospective a 110 volt wall outlet produces sixteen Amps, a Christmas tree bulb produces one Amp, while the TASER only produces 0.0036 Amp.

I examined several medical reviews of the TASER. One review was prepared by Anthony Bleetman and Richard Steyn. Bleetman is a consultant in Accident and Emergency Medicine located at Birmingham Heartlands Hospital, United Kingdom, University of Birmingham, UK. Steyn is a consultant in Thoracic Surgery, also with Birmingham Heartlands Hospital. Bleetman was asked by TASER International to prepare a review describing the potential for injury of the TASER. He was asked to draw conclusions on the devices relative safety and to identify any medical issues. It should be noted, Bleetman had no commercial interest in the TASER. Steyn, who assisted Bleetman, was an expert in chest and cardiac injuries. He also has experience with pacemakers and implantable defibrillators.

Their research revealed that there is no evidence that directly alludes to the TASER being the cause of any deaths in over twenty-five years of use in the United States. Bleetman states: "Risk factors for death in 'tasered' subjects appear to be no different from known risk factors for death in custody

(drugs, exhaustion, bizarre behavior leading to arrest etc.)”
(Bleetman P. 20).

Several of these studies looked at the possibility that the TASER may cause ventricular fibrillation. Ventricular fibrillation from electric shock is characterized by the immediate collapse and death of the subject. In the vast majority of cases where death was associated to the use of the TASER, it occurred some period after the deployment and application. This fact from all of the studies seems to confirm that the risk of death from ventricular fibrillation is very low.

A study was completed by the Department of Emergency Medicine, Hennepin County Medical Center located in Minneapolis, Minnesota. This particular study used thirty-two human volunteers. The purpose of this study was to determine if human exposure to a standard TASER device causes any change in serial 12-lead electrocardiograms. All the participants were administered a five second TASER application with deployed probes from seven feet. The TASER used in this study was the X26, the newest model. Electrocardiograms were performed on the volunteers before and immediately after being tased and once again at sixteen and twenty-four hours after exposure. The results were reviewed by a blinded cardiologist, and the results

were tabulated. At baseline 30 of the 32 subject's EKGs were shown to be normal. The two abnormal EKGs remained unchanged at all four time points. No abnormalities were noted and no changes from base line were detected. The study concluded a five second TASER X26 application did not cause a change in the electrocardiograms of the thirty-two volunteers. Conclusions of TASER induced dysrhythmic death or myocardial damage was not supported by this study(TASER International).

Hennepin County Medical Center recently completed and released the results of a medical study concerning the TASER on February 7, 2007. This study was headed up by Doctor Jeffrey Ho. He was assisted by Doctor Donald M. Dawes of Lompoc District Hospital (Lompoc, CA), Doctor Laura L. Bultman of Northern California Kaiser Permanente (Sacramento, CA) and other researchers from around the country concluded that prolonged exposure to the TASER, "Did not impair respiratory parameters in this population group of volunteers." This study was the most extensive published sampling of human subjects to undergo breath-by-breath gas exchange measurement on the effects of a fifteen second exposure to the TASER X26.

According to the study, the researchers were unable to detect any respiratory impairment during either prolonged continuous or prolonged intermittent exposure to the X26 in this

study population. It does not appear that prolonged exposure to the X26 causes a decreased tidal volume, hypercapnia, hypoxia, or apnea. Doctor Ho recommended further study in this area to validate his results(TASER International).

There has been speculations that the TASER may cause interference with a pace maker. Modern pacemakers withstand electrical defibrillators over a hundred times stronger than TASER conducted energy pulses. Defibrillators function at significantly higher power levels than the TASER. Defibrillators exert 150-400 joules while the X26 exerts only 0.36 joules (TASER Instructor Manual p.38). The few problems that have surfaced for the TASER are minor skin irritation, temporary blisters, redness or minor bleeding if the probes punctured the skin. In rare instances, subjects experienced physical exertion type injuries including injuries to muscles, tendons, ligaments, backs, joints, and stress fractures.

I have personally experienced an application from the TASER in order to carry it. The sensation of your muscles locking up is a sensation you can not prepare for. I attempted to prepare by telling myself moments before my application that it would only be a small shocking sensation. I was completely wrong. There is a shocking sensation of sledgehammers pulsating

through your body for five seconds, which seemed a lot longer. Once the application was complete, I felt as if I had ran a marathon and my muscle were fatigued. I completely recovered within ten minutes. I actually would rather be tased than to be pepper sprayed, which I have also experienced. The recovery after the TASER is much faster. The pepper spray burns and irritates for up to three hours. When you take a shower to remove all the pepper spray it is reactivated and travels into places on your body that are very sensitive. As I mentioned at the beginning of this section, the TASER has been shown in several studies to be safe and non-lethal for suspects.

Decreased Officer and Suspect Injuries

The Bentonville Police Department policy concerning the use of the TASER states: "The TASER may be used when physical force is necessary and justified to subdue a person who is being assaultive toward an officer or another person by threatening physical harm or attempting to deploy physical harm. A display of the unit's "test arc" is permitted to gain compliance in an arrest situation where resistance is anticipated" (sec. 13.1).

Florida Gulf Coast University (FGCU) and the Orange County Sheriff's Office researched 400 cases concerning the TASER and performed an advanced statistical analysis of all cases. Their study hopes to show a better understanding of the TASER and the impact that it has had on law enforcement practices. All less or non-lethal weapons are not perfect and can occasionally create injuries, nevertheless they provide an officer with the ability to regain control of a bad situation. The study breaks down violent law enforcement/citizen confrontations into a series of dealings, which will determine the effect of specific non-lethal weapons in the final outcomes. The study revealed that less lethal munitions (i.e. projectiles) had an 80% injury rate, to include bruises and abrasions. There was also a 2% mortality rate (8 deaths per 373 deployments). K9 teams were also in this study. The K9 was effective 100% of the time with a high level of de-escalation, but had a 30% injury rate. There was a low mortality rate of three deaths in the last 100 years of use. Impact weapons were only effective 50% of the time, with a high level of de-escalation. Impact weapons had a high potential for injuries, a majority were bruises and blunt trauma. Chemical agents were only effective 20-80% with a low injury rate, and a somewhat low mortality rate, sixty-three deaths in twenty years of use. Defensive tactics were

ineffective 29% of the time and had the largest number of suspect and officer injuries. The TASER was effective 77-95% and had a high level of de-escalation 90% of the time. It was ineffective 23% due to misses. The study revealed a low injury rate for the TASER and most injuries were bruises and abrasions from falling. There was a very low mortality rate of .1%; one death per 870 deployments.

The Study exposed significant findings for the deployment of the TASER. There was a 50% reduction by officers in workman's compensation reports due to arrest injuries. Eighteen suspects were subdued with the TASER in a one year period where deadly force would have been justified. The use of the TASER reduced the cost of deadly force litigation for one year by \$1.8 million. There was a 75% reduction in the use of chemical agents, and a 50% reduction in physical force by officers. There was a substantial deterrent effect identified during the study, nine out of ten suspects surrendered when faced with the TASER. If the weapon chosen by the officer was not effective in stopping the suspect's resistance, the suspect was likely to use a greater amount of force against the officer. TASER had the lowest escalation rate of all less lethal weapons, while the baton had the highest of 50%.

The fact remains that without these less lethal weapons, a substantially larger number of law enforcement officer deaths and injuries would have most certainly occurred, creating additional need to use force against suspects. Suspects receive the greatest benefit of less lethal weapons; they are allowed to keep their lives despite their threat or use of deadly force against officers (Mesloh/OCSO 2004).

Several large police departments are keeping statistics on officers and suspects decreased number of injuries due to the deployment of the TASER. The Phoenix Police Department's study revealed a 67% decline in suspect injuries and a 54% decline in officer involved shootings. The Cincinnati Police Department showed a drop in several categories. Officer injuries were down 70% and suspect injuries were down 40%. Officer assaults declined 70%, citizen complaints dropped 50%, and other use of force issues dropped 50%. Granite City, Illinois Police Department worker's compensation expenses were almost eliminated after the introduction of the TASER in 2003. During the year of 2002, worker's compensation was an astounding \$740,172. In 2003, there were no officer injuries as a result of direct engagement with combative suspects.

Seattle and Miami Police Departments went twelve months without a single fatal shooting. For the first time in fifteen

years, the Seattle Police had no fatal officer involved shootings in 2003. During 2003-2004, Miami Police officers went nineteen months without firing a firearm. Prior to the use of the TASER, Miami Police fired firearms at an average of fifteen times a year from 1990 to 2001 (TASER Instructor Manual).

The Green Bay Police Department in Wisconsin completed a TASER report in February 2006. A large portion of the report shows how effective and safe the TASER has been for their department. One incident was cited in the report when officers were dispatched to a home where a 28 year old emotionally disturbed male was attempting to break into the victim's home. It was apparent when the officers arrived the suspect had mental problems and wished for the officers to refer to him as "Jesus Christ." The suspect was not complying with the officers' commands. The officers attempted to take custody of the suspect and began to struggle with him. The officers were unable to place the suspect's hands behind his back to be handcuffed. The officers backed away and deployed the TASER for several cycles until the suspect was safely placed into custody. Without the TASER, additional use of force measures would have had to been employed, including deadly force. The TASER prevented physical

injury to the suspect and to the officers (TASER Instructor Manual).

My personal experience with the deployment of the TASER has been successful without injury to suspects or officers. On one occasion the mere presence of the TASER and a short "test arc" proved to be enough for the suspect to deescalate his actions quickly. The suspect immediately recognized the object in my hand and stated, "I've been tased by you guys before, I don't want it again!" Other officers at my agency have had similar results when the Taser was deployed. Not one officer at my agency has been injured nor has the suspect been injured during a deployment. In other personal experiences where O.C. spray or a baton was used, the suspect continued to fight and resist, resulting in suspects and officers being injured. The TASER without a doubt has been a life saving and injury reducing tool in all the above studies and incidents.

Future of TASER

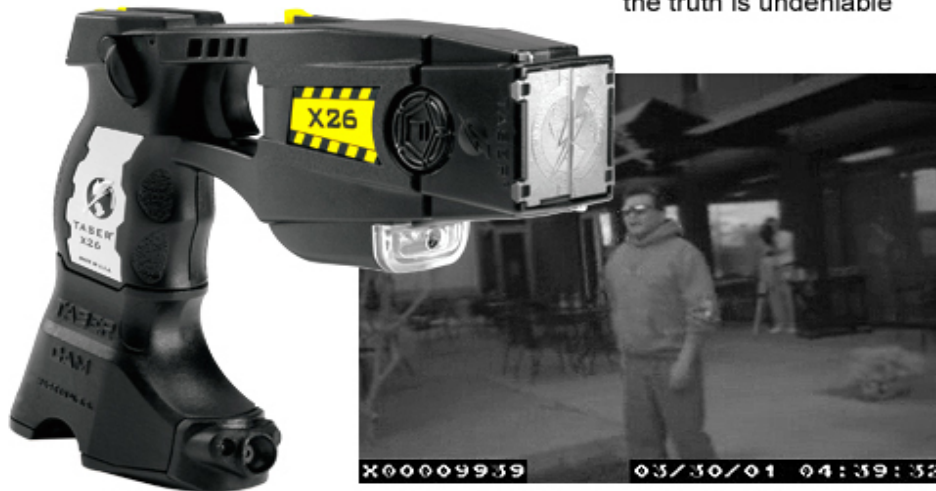


The future of the TASER is unlimited as far as applications for law enforcement and the military. The system the military is showing interest in is the TASER Remote Area Denial (T-RAD) system, which is pictured above. The T-RAD sits upon a tripod, and is a stand alone device that integrates the TASER NMI engine with the TASERCAM infrared imaging system to create a network ready security device that can observe, warn, incapacitate, and retain intruders in a secured area. The T-RAD can fire multiple TASER cartridges, each independently controlled to deliver the TASER X26 waveform. The onboard intelligence, image processing, and network capabilities of the T-RAD offers incredible

deployment flexibility. The T-RAD can be hand emplaced and activated for area denial applications (TASER International).

TASER CAM™

the truth is undeniable



Another item TASER has introduced is the TASER CAM. The TASER CAM offers increased accountability, not just for officers, but the people they encounter. Until now, it's been the officer's word against the suspect's word. With the TASER CAM, the truth is undeniable. Every deployment of the X26 can be recorded with full audio and video, even in zero light conditions (Law and Order, p.87). The International Association of Chiefs of Police (IACP) conducted a study and revealed that police officers are exonerated in 96.2% of complaints when incident video was available (Law and Order, p.9).

Conclusion

The history of the TASER has been confronted by skepticism and scrutiny by several human rights groups over the past several years. The technology has come a long way to prove the TASER to be an effective non-lethal weapon. The medical studies all have shown that none of the deaths have been attributed in anyway to the TASER. All the studies performed by law enforcement agencies around the country have shown that the implementation of the TASER has drastically decreased injuries to suspects and to officers. The TASER has also saved money for many departments due to litigation for deadly force issues. The future of the TASER is very bright as it continues to save lives. The United States Armed Forces are looking very seriously at ways to deploy the TASER for perimeter security and possibly will be deployed by 2008 (TASER Int.). TASER continues to grow in popularity around the world with police departments. When given additional options to resolve a situation, law enforcement would most prefer to not take a life. Officers are thrust into these fast moving, quickly evolving scenarios and are required to make a decision in seconds that may take appellate courts years to decide.

Most officers retire and never had to use deadly force. In contrast, officers have to use less-lethal force everyday, from verbal, to hands on, to TASER weapons. Effective non-lethal weapons like the TASER can help prevent situations from escalating to lethal force levels. The TASER is and will continue to be a life saving tool used by law enforcement around the world.

References

- Grant, T. (2004) TASER International, Inc: Reinventing an Idea from the 1970s." International Directory of Company Histories. Ed. Vol. 62. eNotes.com. 2007. Retrieved February 27, 2007 from the World Wide Web: <http://business.enotes.com/company-histories/taser-international-inc/reinventing-an-idea-from-1970s>
- TASER International Instructor Manual. Version 12 11/04
- Bentonville Police Department Policy and Procedure Manual. Chapter 13. Force.
- Law and Order, The Magazine for Police Management, Vol. 54, N0.11, Page 9, November 2006.
- Bleetman, A. (2003, April 27). The Advanced Taser: a Medical Review. Retrieved March 2, 2007 from the World Wide Web: <http://www.taser.com/documents/tasersubmit.pdf>
- Dr. Mesloh, C. (2004) Orange County Sheriff's Office (Florida) Study. Retrieved March 2, 2007 from the World Wide Web: <http://www.taser.com>
- HCMC Level 1 Trauma Center (2005) Retrieved March 10, 2007 from the World Wide Web: <http://www.taser.com>