“A COMPARATIVE STUDY OF LESS-LETHAL WEAPONS FOR FIRST RESPONDER POLICE OFFICERS”

E.M.U. SCHOOL OF POLICE STAFF AND COMMAND

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An applied research project submitted to the Department of Interdisciplinary Technology as part of the School of Police Staff and Command Program

August 19, 2004

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ABSTRACT

As police officers, we come into contact with many different types of people everyday, with the majority not causing a problem. It is the minority, the emotionally disturbed, the person under the influence and those who are combative, who give police officers the most problems and are the most likely to be injured and/or cause injury during police contact and file lawsuits alleging excessive force. Until recently law enforcement did not have the tools and training to effectively deal with these individuals, while at the same time reducing injuries and liability. The development of less-lethal weapons has given law enforcement these tools.

Studies and field testing had shown that less-lethal weapons were effective in significantly reducing lost time due to police officer injuries while encountering a combative subject. It has also resulted in decreased excessive force complaints. These less-lethal weapons: OC spray, TASER and specialty impact munitions have been very effective when combined with the proper training and deployment within a generally accepted use of force continuum.

The information in this study was compiled from published studies, journals, field testing and equipment manufacturers. It was intended to make the reader aware of the problems encountered by law enforcement when dealing with hostile subjects and the options available to police officers and departments to reduce injuries and liability. Further this study

outlined a plan for the Wyandotte Police Department to implement additional less-lethal weapons for the police officers assigned to the road patrol.

INTRODUCTION

A drug dealer running from police down a city street grabs an elderly woman, puts a knife to her throat, and screams at pursuing officers to back off. A brawling drunk in a neighborhood bar breaks a bottle and attacks an advancing patrolman called in to break up the fight. Protesters outside an abortion clinic scuffle with police as the protesters push toward the clinic doors. A distraught man armed with a weapon advances on police officers, pleading for them to kill him. In the past, in each of these scenarios, police officers would have been limited to one of three courses of action:

1. They could try to convince the offender to surrender.
2. Strike them with batons.
3. Use Deadly Force.

Sadly, talking to individuals who are out of control rarely works. Thus officers had to resort to the use of force. But force, more often than not, caused injury to the alleged suspect and the police officers themselves. It also left police officers vulnerable to lawsuits for excessive use of force (Fischetti, M). Now, thanks to advances in technology, police officers have options other than deadly force when it comes to subduing criminals and disturbed persons by drawing from an arsenal of less-lethal weapons (LLW). These less-lethal weapons buy police officers a few critical seconds, by causing a

temporary physiological change in the suspect, allowing officers to take a person into custody while suffering far fewer injuries. These weapons are less lethal in the literal sense because there is no weapon that can be guaranteed not to cause serious injury or death.

BACKGROUND AND SIGNIFICANCE

Many well-known incidents that created uproar and led to civil disturbances and police reform include the beating death of Arthur McDuffie in Miami (1979), the beating of Rodney King in Los Angeles (1991) and the beating death of Malice Green in Detroit (1992). As a consequence of these and other more recent events, police administrators and researchers have looked critically and comprehensively at the use of force, its justifications, levels and methods. (Smith and Alpert 2000)

As a direct result Michigan Law Enforcement has seen the development and implementation of the Use of Force Continuum by the Michigan Commission of Law Enforcement Standards (MCOLES). The Use of Force Continuum provides police officers with a series of escalating steps in the amount of force used as the suspect’s level of resistance increases. This also provides for a de-escalation of the amount of force used as the threat or risk posed by the suspect diminishes. However, officers are always permitted to skip steps within the Use of Force Continuum should the threat level rapidly escalate or the suspect

surrender. The development of the Use of Force Continuum was a step in the right direction in reducing allegations of misconduct and excessive force, against police officers. The application and use of force by police, using conventional methods of defensive tactics, has not reduced the likelihood that during a physical confrontation with a suspect, an injury would occur to either the police officer or suspect. Less-lethal weapons now give police officers the tools to overcome physical resistance without using unreasonable force or causing unnecessary injuries (Smith & Alpert). This research will be limited in scope to three (3) types of less-lethal weapons most commonly utilized by police officers normally assigned to road patrol:

1. Oleoresin Capsicum Aerosol Spray (OC).
2. TASER.
3. Specialty Impact Munitions (SIM).

How each type of less-lethal weapon operates, where its use fits into the MCOLES Use of Force Continuum and their limitations.

LITERATURE REVIEW

The United States Department of Justice through the National Institute of Justice (NIJ) has four (4) publications on Less-Lethal Technology concerning the use of OC and Pepper Spray as force alternatives and their effects on a suspect’s ability

to breath (National Institute of Justice, n.d.). These articles discussed various studies in how the use of OC early in the use of force continuum resulted in a reduction of lost work days due to injuries sustained in making an arrest and a reduction of suspect injuries and subsequent reduction in lawsuits for excessive force. These articles also discussed in custody deaths of suspects exposed to OC. Autopsies revealed that OC may have triggered severe asthma attacks in two deaths and that the other deaths were due to other unrelated health problems and/or the presence of a controlled substance. Autopsies also revealed that OC spray was not a factor in positional asphyxia sudden deaths.

The Seattle Police Department (SPD) has taken the lead in studying less-lethal weapon options and has made available, through their Web Site, studies concerning Less-Lethal Weapon Options, The Use of Force by SPD Officers and the Less-Lethal Weapons Program one (1) year after implementation (Seattle Police Department, 2000). SPD recognized a need to add less-lethal weapons to their arsenal of weapons and formed “The Force Options Research Group” (FORG) to study and recommend less-lethal weapons along with training protocols and applicable policy for the implementation and utilization of less-lethal weapons. The FORG recommended and SPD implemented a less-lethal weapons arsenal consisting of the M26 TASER, shotguns equipped with beanbag munitions and Crisis Intervention Training (CIT) in

addition to the OC spray already in use. SPD then reviewed their less-lethal weapons program one year after implementation. SPD found that they exceeded their training goals for CIT however they also found a reluctance of non CIT trained officers to request a CIT officer resulting in several incidents that exposed police and citizens to a greater risk than necessary. This caused SPD to make several changes in their training protocols. SPD exceeded their goals for training and issuing the M26 TASER to patrol officers which resulted in the successful resolution of 92% of the incidents where the TASER was actually used (Seattle Police Department). SPD had also purchased, but have not deployed the shotgun with bean bag munitions. SPD was still developing an eight (8) hour training and certification program. SPD recognized this is a medium range (20-50 feet) less-lethal weapon but still had concerns that this less-lethal weapon could cause very serious injuries and even death. SPD believed that a public education campaign was necessary before placing this less-lethal weapon in the field (Seattle Police Department).

Other sources used for this research paper included the manufacturers of less-lethal weapons who provided useful information concerning the effective ranges of the less-lethal weapons, chemical compositions, and technical applications, the use of force continuum, equipment costs and required training.

However, I realized that manufacturers and vendors for less-lethal weapons are only going to provide information that shows their products in the most favorable light. This was tempered with the use of independent reviews, in law enforcement publications from 2003-2004. These law enforcement publications have articles concerning police department experiences with various types of less-lethal weapons and discuss training protocols. These articles exposed shortfalls and limitations in less-lethal weapons and reminded us that less-lethal weapons may still cause fatalities even with proper training and deployment. These publications also discussed the current controversy of TASER training and whether to require officers to be “exposed” to the TASER as part of the certification process. This is similar to the training controversy when OC spray was introduced to law enforcement and officers were required to be exposed to the effects of the OC as part of that certification process. Several newspaper articles tell about “police standoffs” with emotionally disturbed individuals or barricaded suspects which were concluded without death, due to the deployment of less-lethal weapons instead of deadly force. These articles reinforce to the public that there are workable alternatives for the police to use that save lives and avoid what the media calls police executions or otherwise needless deaths.

METHODOLOGY

Research for this project was comprised of information gathered from various sources on the Internet. Due to the subject matter, information was readily available and easy to locate. I utilized search engines such as google.com, dogpile.com and yahoo.com. I also utilized the Eastern Michigan University Library Database and obtained information from the Criminal Justice Abstract, Detroit News, Lexis-Nexis Academic, National Criminal Justice Reference Service and WorldCat databases.

By researching this topic, I was able to make specific recommendations to the Chief of Police concerning implementing additional less-lethal weapons in the Wyandotte Police Department (WPD) arsenal. I was also able to update and amend WPD Polices and Procedures on Firearms, Authorized Weapons and Use of Force, incorporating the recommended additional less-lethal weapons specifications and training protocols. This research project will also assist other police departments who are considering adding less-lethal weapons to their arsenals.

RESULTS

Oleoresin Capsicum Aerosol Spray

Oleoresin capsicum (OC), or “pepper spray”, has gained acceptance and popularity among law enforcement officers and

police agencies as a safe and effective method of incapacitating violent or threatening subjects (National Institute of Justice, 1994).

OC spray, like tear gas agents CN (chloroacetaphenone) and CS (orthochlorobenzalmalononitrile), can be produced synthetically, however, unlike CN and CS, OC is a naturally occurring substance. OC is found in the oily resin of cayenne pepper-the same type used to heat up spicy foods. OC, when sprayed in a mist, incapacitates by an immediate burning sensation of the skin and more importantly a burning, tearing and swelling of the eyes. When OC is inhaled, the respiratory tract is inflamed, causing a swelling of the mucous membranes which temporarily restrict breathing to short, shallow breaths. CN and CS also cause painful tearing and respiratory discomfort, but do not cause the inflammation and swelling effects of OC. This distinction between CS/CN and OC is important because those subjects who are mentally ill or under the influence of drugs and/or alcohol may not feel pain and may not be affected by CS/CN as they would be by the inflammation and swelling effects of OC (National Institute of Justice, 1994).

For example, someone under the influence of phencyclidine (PCP) is oblivious to pain and when sprayed with CN or CS, are able to keep their eyes open and continue to offer resistance to the police. When sprayed with OC, they have the same

physiological reactions as anyone else, their eyes will swell shut involuntarily and they suffer shortness of breath. While they don’t feel pain, fear and disorientation from the temporary blindness gives a tactical advantage to police officers when attempting to affect an arrest.

Another advantage of OC over CS/CN is that no special decontamination procedures are necessary. OC is biodegradable and doesn’t linger in clothing or on skin. All that is needed is proper ventilation and access to water for flushing the eyes and skin. The effects of OC usually only last about 20-30 minutes with no injury to the subject.

OC sprays are available in concentrations of 5-10% for law enforcement. This can be misleading because it is the strength of the OC, not the percentage of volume, which determines the effectiveness. The strength of the OC depends on the grind of the pepper before the oil is extracted. This strength is measured in Scoville Heat Units (SHU) so the higher the SHU, the greater the inflammatory capacity of the OC. Additionally, since OC is an oil; for it to work, it must atomize into a fine spray. OC solutions over 5% do not atomize as well (National Institute of Justice, 1994). When using OC spray at a distance of five (5) feet of less, it is still in liquid form and will only impair the vision. The most effective range is 5-12 feet where it becomes a mist atomized into a fine spray.

One of the most important considerations when selecting an OC spray is if the carrier is isopropyl alcohol-based or nonalcohol-based. OC sprays using an alcohol base are inflammable and must never be used with a TASER. The electrical charge will ignite the alcohol base in the OC spray, setting the subject and his clothes on fire.

Training in the use of OC is critical to protect both the police officer and the agency from liability and to ensure officer safety. Training is recommended to be a minimum of four (4) hours of instruction covering: technical application, physiological vs. pain reaction (including first hand exposure to the effects of OC spray), decontamination protocols, legal issues and department policy. While first hand exposure to OC during training is controversial it helps officers who later may be exposed to a dose of OC spray from an unexpected gust of wind, poor aim from another officer or worse if a canister falls into the hands of a suspect. I can say that from first hand experience; although being exposed was very unpleasant, being exposed to OC during training helped me. I got a face full when another officer sprayed OC into the wind without warning. I knew what to expect and didn’t panic. I was able to maintain control and place the subject in custody.

The use of OC spray is justified in the MCOLES Use of Force Continuum when an unarmed subject shows active resistance by not

complying with verbal direction. Traditionally the officer at this point would use soft empty hand techniques such as joint locks or pressure points, to take control, resulting in the subject and possibly the officer have receiving injuries which required medical treatment. Now, instead, police officers after verbally warning the subject that continued resistance will result in he or she being sprayed, use OC spray to incapacitate the subject and taken them into custody with out injury.

The National Institute of Justice (NIJ) funded the North Carolina Study which found the number of injuries to police officers and suspects declined significantly after pepper spray was introduced. Complaints that police used excessive force also declined (National Institute of Justice, 2003).

Once the subject is taken into custody they should be monitored carefully until the symptoms disappear. Medical care should be provided immediately if symptoms worsen, last more than 30 minutes or is requested by the subject. Since OC causes breathing passages to swell and constrict a person with pre-existing respiratory conditions such as asthma could in some instances die.

After OC spray was adopted by law enforcement, a number of arrestees exposed to OC have died in custody, prompting allegations that OC inhalation places individuals at risk for potentially fatal respiratory compromise. The NIJ supported a

study by medical researchers at the University of California who examined the combined effects of OC exposure and positional restraint on respiratory and pulmonary function on 34 subjects recruited from a law enforcement training academy. The research findings suggest OC spray doesn’t pose a significant risk in terms of respiratory and pulmonary function, even with positional restraint. Researchers found no evidence of respiratory compromise in over weight subjects or in those with histories of lung disease, asthma, smoking or use of an inhaler in both the sitting or restraint positions. Limitations of this study included performance in a clinical laboratory setting and it did not attempt to replicate all conditions found in the field. Field subjects are often in a state of extreme agitation and “excited delirium” as a result of psychiatric disease or intoxication from drugs or alcohol which can be compounded by violent physical struggles and extreme physical exertion (National Institute of Justice, 2001). The NIJ funded North Carolina study which researched the cause of 63 in custody deaths after subjects were exposed to OC spray. This study determined that in 61 cases death resulted from the use of drugs, disease or positional asphyxiation. Only in two cases OC could have been a contributing factor where those subjects had severe asthma and the OC triggered bronchial spasms. Those two subjects were obese and kept face down in a prone position while

handcuffed behind the back (National Institute of Justice, 2003). While OC spray has been widely in use by law enforcement since 1995 and the death rate attributed to its use is very low, it is important for officers using it to know of its possible effects on a subject with respirator problems when combined with the condition known as positional asphyxia. This is when the subject is kept face down in a prone position handcuffed behind the back. This position can cause difficulty breathing when pressure is applied to the back compressing the lungs. These factors can be compounded when the subject is obese, under the influence of drugs and/or alcohol or has an enlarged heart. NYPD guidelines to prevent in custody deaths include getting the subject off of his stomach as soon as they are handcuffed, placing them on their side or in a sitting position (National Law Enforcement Technology Center, 1995).

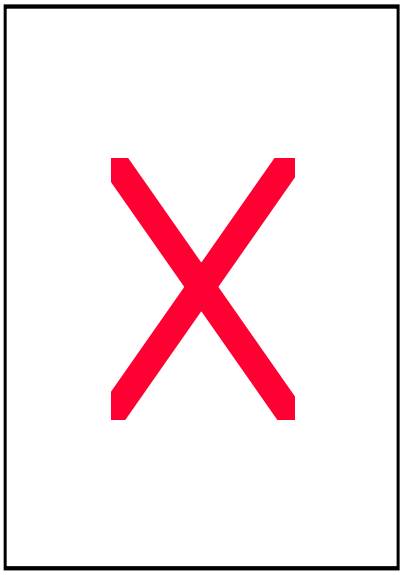
As with any use of force, the use of OC spray must be thoroughly documented in the officer’s incident report.

TASER

The TASER, which is a brand name for an electro muscular disruption weapon, was invented in the late 1960s by Jack Cover who came up with the idea as an alternative for deadly force when police officers dealt with violent offenders. The TASER was based on a stun weapon Cover read about as a child in Tom Swift

stories, thus the acronym Thomas A. Swift Electrical Rifle (TASER) (Smith, 2002). The first TASER was classified by the Bureau of Alcohol, Tobacco and Firearms (ATF) as a Title II firearm because it used gunpowder to propel the electrical barbs. The TASER was first adopted by the Los Angeles PD (LAPD) in 1976 and did not gain wide acceptance by law enforcement until much later. In 1994 the design of the TASER was changed to eliminate the use of gun powder, using compressed gas to propel the barbs, and ATF certified the device was no longer a firearm, opening the door for wider use in law enforcement. The design of the TASER was further refined in 1998 and the New York PD (NYPD) received their first shipment of 30 TASERs. This opened the door for wide spread adoption of the TASER by law enforcement as another tool in the less lethal weapons arsenal (TASER International, 2004).

The TASER resembles a pistol and propels two barbs, which remain attached to the TASER by two twenty one foot insulated wires, into a subject. The darts deliver a five second burst of



50,000 volts and 26 watts of electrical current that can penetrate two inches of clothing, as depicted in the above illustration, from the Seattle PI newspaper (Castro, 2004). The effects are immediate. The electrical impulse causes an electro-physical, involuntary contraction of skeletal muscle tissue and directly stimulates motor nerve and muscle tissue, causing incapacitation regardless of mental focus, training, size or drug induced dementia, which causes the subject to fall to the ground (TASER International, 2004).

The TASER has a range of up to twenty one feet, with an optimal range of twelve to eighteen feet and operates on AA batteries. The TASER, once the cartridge is removed or expended, can be used as a traditional contact stun backup. The TASER is considered an intermediate weapon and, according to the MCOLES Use of Force Continuum, would be used when a subject shows active aggression. Active aggression is when the subject is about to take physical actions/assault against the police officer or another person. Traditionally, the police officer would respond to active aggression with a baton or other impact weapon which usually resulted in the subject and some times the officer requiring a trip to the emergency room. The TASER allows the officer to bring a violent subject under control with out causing any injury beyond minor skin irritation from the barbs. Prior to deploying the TASER an officer should always verbally

warn the subject that if they do not comply, they will be “tased” and must have back up on scene to secure the subject so the officer can continue to administer the electrical impulses if necessary. The subject, once the five second impulse is done, begins to recover and muscular motor nerve control starts to return.

While the TASER is a very good addition to the less-lethal weapon arsenal and the advantages are obvious, it does have limitations (Seattle PD, 2002):

- It does not replace deadly force in dealing with armed subjects.
- It loses effectiveness when the subject’s clothing or layers of clothing exceeds a thickness of two inches or is wearing body armor.
- Subject must be hit with both barbs.
- The effects can transfer to another person, including officers, who come into contact with the barbs while the TASER is activated.
- Cold weather can affect the operation of the standard alkaline batteries.
- The TASER can ignite flammable liquids, vapors, some explosives and should never be used in or near a suspected methamphetamine lab.

Training in use of the TASER is critical to protect both the police officer and the agency from liability and to ensure officer safety. The TASER uses the same hand motions and muscle memory as a standard semi-automatic pistol, drastically reducing training time and increasing accuracy under stress (TASER International, 2004). Training is recommended to be a minimum of four (4) hours of instruction covering: technical application, physiological reaction (including first hand exposure to the effects of the TASER), removal of the barbs, legal issues and department policy. Just as discussed in the OC section, first hand exposure during training to the TASER is controversial. However it helps officers understand the effects the TASER has on a subject instilling confidence in the capability of the weapon and to prevent possible misuse (Janin, 2004). To keep training costs to a minimum a cartridge that has been expended can be re-used by taping the barbs to the officer’s clothing. After the subject is taken into custody rescue personnel should be dispatched to the scene to remove any barbs that have penetrated the skin and treat them as a biohazard sharp.

As with the adoption of OC spray, by law enforcement, there have been concerns surrounding the use of the TASER and its effects on the human body. TASER International (TI) has certified that the TASER is non-destructive to nerves, muscles and other body elements through extensive developmental and

field testing. TI stated the output of the TASER is below the level established as “safe” by the Federal Government in approving such devices as the electrified cattle fence. Further TI points out that a recent medical study of the TASER, conducted at the University of Missouri by Dr. Robert Stratbucker, concluded that the impulse generated by the TASER does not interrupt the heartbeat or interfere with the operation of a pacemaker, which are designed to withstand electrical defibrillator pulses that are hundreds of times stronger than the TASER output (TASER International, 2004).

Specialty Impact Munitions

Throughout the history of law enforcement, police officers have utilized various forms of impact weapons that cause blunt trauma, to keep the peace. These weapons were generally hand-held and meant to be used within arms reach. As early as the 1960’s, law enforcement began experimenting with the use of specialty impact munitions, using wood baton rounds on rioters and the early development of the bean bag round. This section will focus on specialty impact munitions (SIM) for use by first responder police officers only in patrol situations.

Dealing with an emotionally disturbed person with a weapon and phenomena known as “suicide by cop” has fueled the necessity for the development and deployment of weapons that police

officers can use to bring an incident to a safe conclusion without having to resort to deadly force.

You will find a 12 gauge shotgun in virtually every police patrol vehicle in the Untied States today. The development of SIM for use by patrol officers utilizes the pump action shotgun as a launcher, which greatly reduces a department's equipment purchase costs when implementing this less-lethal weapon. The only recommended modification to the pump action shotgun is to replace the stock and fore grip with synthetic ones that are orange to readily identify that the weapon is loaded with less-lethal rounds only. SIM weapons have an effective range of twenty-one (21) feet or greater which is the minimum safe distance an officer should maintain with a subject armed with an edged weapon or club.

Pennsylvania State University (PSU), in conjunction with the Los Angeles County Sheriff's Department (LASD), conducted a study of SIM which showed that accuracy decreased significantly as the range increased, while testing their accuracy at 21 and 75 feet. The PSU study showed that direct fire SIM cannot be fired accurately at 75 feet. The study also showed various degrees of accuracy even at 21 feet, depending on the type of SIM and launcher used. Direct fire munitions are those intended to be fired directly at a person such as a 12 gauge bean bag round. The distance of 21 feet was tested because standard

training protocols require this be the minimum distance from a subject armed with an edged weapon or club. The distance of 75 feet was tested because that is considered the distance which a person can throw an object large enough to cause serious injury. Further the PSU study found the 12 gauge pump action shot gun is the preferred launcher because it was the most accurate with groups of multiple shots within five inches of each other. The pump action shot gun will chamber rounds with the pump action, while a semi-auto shot gun will not once the initial round is ejected, requiring a manual reload. The 37mm and 40mm launchers tested the most unreliable due to excessive misfires and groups of approximately 48 inches for multiple shots. Additionally the drag stabilized and fin stabilized bean bag projectiles were consistently the most accurate direct fire SIM both having a 5 inch group with multiple shots. The PSU study concluded that the 12 gauge pump action shot gun is the best launcher which provides a desired accuracy of a 10 inch or less dispersion when fired at 21 feet utilizing stabilized bean bag rounds which cost $4.00 each or less, which is suitable for the needs of patrol situations (Kenny, Heal & Grossman, 2003).

The use of SIM has a tremendous psychological effect as well as a physical effect on a subject who is staring down the barrel of a shot gun being pointed at him by a police officer. In many cases the psychological effects may have a greater

effect on the subject’s incapacitation or distraction due to anxiety, fear or panic. The desired physiological effect of shooting a subject with a SIM is blunt trauma that being the incapacitation of the subject without causing serious injury or death (Armor Holdings Inc, 1999). SIM should only be used when justification for the use of deadly force exists when you are dealing with an armed subject and would be facing a deadly force assault. The MCOLES Use of Force Continuum places the use of SIM at the level of a deadly force response.

Training in the use of SIM is critical to protect both the police officer and agency from liability and to ensure officer safety. SIM are fired from a standard police pump action 12 gauge shot gun, with the Remington model 870P being the most common. The stock and fore grip should be replaced with orange colored synthetic to clearly mark this weapon as less-lethal so regular rounds are not accidentally loaded, which could have deadly results. Defense Technology Federal Laboratories, a major manufacturer of SIM recommends a minimum of eight (8) hours of instruction covering: technical application, physiological reaction, legal issues and department policy. It is important for police officers to understand that the SIM is capable of inflicting serious injury or death(Armor Holdings Inc, 1999).

DISCUSSION

The development of less-lethal weapons has given police officers several alternatives to deadly force when dealing with hostile subjects. These alternatives, when adopted by law enforcement agencies, have resulted in fewer injuries to suspects and police officers as well as a reduction in excessive force complaints (Seattle PD, 2002).

When I chose this topic, I was expecting to find one less-lethal weapon that could be used in most situations involving a hostile subject, “a one size fits all solution”. However, what I found was that each of the three less-lethal weapons discussed in this paper, are not “a one size fits all solution”, instead each less-lethal weapon falls in different levels of the MCOLES Use of Force Continuum. This means while one less-lethal weapon may be appropriate for a certain threat level, it may not be appropriate for another. Each less-lethal weapon has a specific optimal effective range and that combined with the threat level dictates which is the most effective to use in a specific situation. The additions of OC spray, the TASER and SIM, to a department’s less-lethal arsenal are all necessary to give police officers the best alternatives when dealing with hostile subjects.

All the less-lethal weapons discussed in this paper are within reach of most departments. The OC spray aerosol canisters

my department issues to each officer cost about $5.50 and require four (4) hours of training. The SIM utilizes the most common weapon in a police department's arsenal, the 12 gauge pump shot gun, only requiring that the stock and fore grip be changed at a cost of about $100.00 per gun. The SIM 12 gauge rounds cost about $4.00 each and eight (8) hours of training is recommended (Armor Holdings & Inc, 1999). The TASER is the most expensive less-lethal weapon, costing about $800.00 each, the barb one time use cartridges cost about $25.00 each, and four (4) hours of training is recommended (TASER International, 2004). Homeland Security Grants may be available for departments to use to purchase these less-lethal weapons. I believe the greatest obstacle to implementing a less-lethal weapon program is the cost and scheduling of proper training.

RECOMMENDATIONS

Currently the Wyandotte Police Department (WPD) only utilizes OC spray and a baton as less-lethal weapons. The WPD also has one sergeant trained as a SIM instructor and a spare Remington 870P 12 gauge shot gun is available as a less-lethal weapon. I recommend the following be implemented as soon as practical:

1. The Use of Force Policy be reviewed and amended as needed to allow for the use of OC spray, by a police

officer, when a subject shows active resistance and to allow for the use of SIM, by a command officer, when a deadly force response is justified.

2. The Chief of Police issue an order designating a Remington 870P shot gun for use as a less-lethal weapon, placing this weapon in a specially marked case and keeping it in the trunk of the supervisor’s patrol car.
3. The Chief of Police authorize the purchase of an orange stock/fore grip for the Remington shot gun and the purchase of the required 12 gauge stabilized bean bag rounds
4. The Firearms Training Policy be reviewed and amended to include SIM training protocols.
5. All sergeants and lieutenants receive training in the use of SIM.

I recommend the following for implementation in fiscal year 2006, which begins October 1. 2005:

1. Obtain a TASER for evaluation and eventual purchase.
2. The Use of Force Policy be reviewed and amended to allow for the use of a TASER when a subject shows active aggression.
3. The Authorized Weapon Policy be reviewed and amended to include the TASER.

4. The Firearms Training Policy be reviewed and amended to include TASER training protocols.
5. A WPD firearms instructor be trained as a TASER instructor who intern will train all sworn Department members.
6. The Chief of Police authorize the purchase of the required number of TASERs and cartridges.

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The Role of Less- Lethal Weapons in Law Enforcement

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An applied research project submitted to the Department of Interdisciplinary Technology
as part of the School of Police Staff and Command Program
August 19, 2004

ABSTRACT

There are many tools available to law enforcement agencies to assist in apprehending and controlling uncooperative subjects. These tools range from the officers hands and physical force to a variety of firearms. In the middle is a wide range of tools that most law enforcement agencies have just begun to scratch the surface of. These tools are called less-lethal weapons and non-lethal weapons. The intent of these tools design is to stop or control a person without killing or causing permanent injury to them. They are designed to be humane yet carry enough stopping power to prevent a suspect from continuing an assault on others or himself. This paper will look at a few of these Less-lethal weapons and their applications in Law Enforcement.

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INTRODUCTION

America is an ever increasingly violent society and the public demands the law enforcement community react firmly to the problem. At the same time, law enforcement is under ever increasing scrutiny of the media, trial lawyers associations, the ACLU, and an onslaught of citizens armed with video cameras. Incidents such as the 1991 Rodney King arrest in Los Angeles have hampered law enforcement agencies and caused them to rethink the use of traditional police tools such as batons.

The pressure to add new less lethal weapons to police arsenals became tremendous in the mid-eighties. In 1985 the Supreme Court ruled in Tennessee vs. Garner that the use of deadly force to apprehend unarmed nonviolent fleeing felons was an unreasonable seizure under the fourth amendment. Attorney General Edwin Meese called a conference to investigate the need for alternatives to deadly force. The National Institute of Justice was tapped to investigate several ideas to meet this need and eventually a study on chemical incapacitants was funded. After the Rodney King incident in 1991, finding practical, non-lethal weapons for police use became a priority for the Department of Justice. The stand off, between federal law enforcement agents and the branch Davidians outside Waco Texas in 1993 caused Attorney General Janet Reno to call for increased efforts and more funding to find a less lethal solution. Today, a wide array of less lethal weapons has found their place in law enforcement and many have military applications as well.

BACKGROUND AND SIGNIFICANCE

Why less lethal weapons, what is their purpose and where do they fit in? In the year 2002, 58,066 law enforcement officers were assaulted in the line of duty (Table 1). Over 28% of the officers assaulted suffered personal injury. The majority of these officers were assaulted while responding to disturbance calls, which include domestic disputes and bar fights. The majority of the officers assaulted were assigned to one officer uniformed patrols. Nearly 81% of the assaults were committed with personal weapons, hands feet, fists etc. When officers were assaulted with personal weapons 29.8 % suffered injuries. Firearms only accounted for 3.3 % of assaults on officers.

Most of the complaints in which officers were assaulted started as misdemeanor calls, which generally do not call for the use of deadly force.

Based on the above statistics an officer is most likely to suffer an injury when confronting an unarmed individual while working alone on uniformed patrol and answering a disturbance call. It would therefore be reasonable to provide the officer with the means to protect himself, which is less then the lethal force of a firearm and a greater force then personal weapons.

LITERATURE REVIEW

The United States Department of Justice Uniform Crime Report for 2002, Section II breaks down information on assaults committed on sworn city, county and state law enforcement officers. The information is collected monthly from URC program participants who submit data through their state UCR programs or directly to the FBI. Information was collected from 9,987 law enforcement agencies in the year 2002.

The United States Department of Justice and the National Institute of Justice published the results of several funded studies to develop less and non- lethal weapons for law enforcement use. These studies were funded by the National Institute of Justice and conducted by industry and private and military research facilities. The proposed research ranged from extreme sci-fi to practical tool development.

The police marksman magazine published an article about Oleoresin Capsicum and a field study conducted by the New Britain, Connecticut Police Department. This study found that the spray was highly effective, easy to use, inexpensive and training time for officers was minimal.

Police Magazine outlines various non-lethal weapons in use by the German SEK and the successes they have had with these weapons in situations ranging from barricaded gunmen to hijackings and high-risk arrests.

CNN, Cable News Network recently carried an Associated Press story about laser beams and directed energy systems as less lethal weapons currently in development.

PROCEDURE

Research for this project involved a review of reports and statistics compiled by the United States Department of Justice, Uniform Crime Reports, books, trade publications, training manuals and the World Wide Web. Search engines included Google and dogpile**.**

The objective of this research was to identify the need for less-lethal weapons, as well as a variety of less-lethal weapons available to law enforcement and their application.

RESULTS

It is obvious from examining the uniform crime reports from the year 2002 that effective, easy to use weapons systems with a low chance of lethal results that will pass public scrutiny are a necessity. These weapons must not only meet the needs of the officer on the street but also be affordable, easily maintained and "acceptable in the eyes of the public".

Several less lethal and non-lethal weapons have been developed and found their place in law enforcement. The difference between less lethal and non lethal weapons is that a non lethal weapon cannot cause death no matter how it is used and is therefore placed on a lower rung of the force continuum ladder below deadly force and less lethal force. When the National Institute of Justice began its study of less lethal weapons in 1991, a set of parameters were given for less lethal weapons to meet before they could be considered for further study for law enforcement use.

- It had to improve on a present practice
- It could not overburden the officer
- It had to be inexpensive
- It could not require extensive training
- It could not require dedicated manpower
- The liability issues had to be manageable
- It had to work

The study began by looking into technology already in use by the military and private industry. Ideas with promise were divided into three categories for closer examination.

- **Off the shelf-** technology that already existed and was in use
- **Some assembly required-** technology that did not require extensive development
- **Scratch-** ground up projects

At the same time, teams of social scientists, researchers and criminal justice practitioners were studying policy issues, liability issues, possible public reaction to these tools and political ramifications of using these tools.

In the late 1980's and early 1990's several of the devices began to show promise as useful less lethal tools for law enforcement.

Air Bags

An area of concern for officers is transporting uncooperative or out of control suspects in the back seat of patrol cars. One method used in the past was to handcuff the suspect behind his back and tie his feet to the handcuffs with a lead or "hog-tie" the suspect. The suspect was then transported face down on the back seat of the patrol car. This method of transport does not allow the suspect to be secured in the seat and puts him at great risk in the event of a crash. This method of transport also puts the suspect at great risk for positional asphyxia.

An alternative was developed by the Idaho National Engineering Lab in Idaho Falls. A rapidly inflating airbag is installed in the rear seat of the patrol unit. The bag can be inflated by the officer to immobilize the suspect while still allowing him room to breathe. Unlike the traditional airbag used as a supplemental restraint device in the front seat of automobiles today, this airbag remains inflated until deflated by the officer. Another thought the to use of this device is to allow the officer the option of slowing inflating the bag after warning the prisoner which, may have a psychological effect and also give the suspect an opportunity to calm down.

Sticky Foam and Aqueous Foam

Sticky foam was developed for applications in prisons and as a tool for SWAT teams. Sticky foam is a spray foam so sticky it can stop a person in his tracks. An officer only has to spray a suspect's torso with the foam to entangle and immobilize him. Anything he touches to the foam will stick. Arms and legs can be "glued" together making it impossible to move.

The foam is delivered from a special shoulder fired dispenser that can hit a target from as far away as 35 feet. The foam could be used by swat teams in hostage situations, to put down jail disturbances or even to block rooms or hallways after being cleared by an entry team and denying access to a suspect. The United States Military used a similar device with great success during Operation Desert Storm in situations where lethal force was inappropriate.

Aqueous foam is a water based foam similar to soap suds and used as an obscurant. A person in a room flooded with aqueous foam would be able to breathe but would not be able to see much or find there way out.. Aqueous foam was primarily designed for use in prisons and jails to isolate persons not restrain them.

Flash and Bang

Keeping Officers a safe distance from potentially dangerous persons while still controlling their behavior led the experiments with distraction and disorientation devices. These devices use sound, lights or a combination of both to disorient a suspect. White lights flashing lasers and strobe lights were developed for uses in jails and prisons to disorient an inmate long enough so officers can gain physical control of him. Strobe

lights used in low light areas or areas where light sources can be control can actually interrupt or disable coordinated motor movements of a suspect.

The most commonly used disorientation device currently in use is the flash bang grenade. This device is used by SWAT teams to distract suspects prior to making an entry on barricaded suspects or during hostage situations. The flash delivers a bright light and the bang a loud noise that distracts the suspect long enough for officers to make an entry.

One of the ideas surrounding flash bangs being developed is increasing the flash by using pulses or bursts of light bright enough to temporarily blind anyone in the room. The device would be small enough to toss into a room and flash continuously until disabled by an officer. Goggles are being developed with a gating device that would be synchronized to open and close as the light flashes. The goggles would close when the light flashes and open when the light is off.

Star Trek Stuff

The magnetosphene gun and the thermal gun are based on long existing technology. The magnetosphere gun was proposed for use on persons under influence of drugs or alcohol and those suffering a mental illness. These people are often impervious to other types of devices but should be susceptible to the magnetosphene gun. This device delivers what feels like a blow to the head, stunning the suspect. It has a range of 10 to 20 yard and can be delivered through a wall.

The thermal gun can also be aimed through a wall and has a range of up to 50 yards. The thermal gun forces a suspects body temperature up to 107 degrees causing incapacitation.

Directed energy weapons are being researched for use in dealing with large unarmed crowds. Directed energy weapons could also be used to disable the electronics in a fleeing car and prevent a dangerous police vehicle pursuit. One system being developed by Raytheon and the Air Force is called the Active Denial System. It heats the water molecules in the targets skin with microwave energy and caused intense pain. When the beam is redirected or turned off the target returns to normal and there is no residual pain. Military field deployment of this weapon is expected by the end of 2005.

Sonic Weapons, or weapons which use sound to incapacitate disorientate or confuse human targets have been used for years. The Bible, in Joshua 6: 5 tells the story of Joshua leading an attack on the city of Jericho and using blasts from trumpets made from ram's horns to bring the walls of Jericho down. More recently, American soldiers blasted heavy metal rock and roll from large speakers mounted to their vehicles to create psychological terror among the Iraqi troops fleeing Kuwait along the road to Basra during the first Gulf War. This tactic was also used against General Manuel Noriega in Panama and the Branch Davidians in Waco, Texas.

The human ear can hear only a limited part of the sound spectrum. Levels above the range of human hearing are called ultrasound. Levels below are called infrasound. In the 1960s NASA conducted extensive research on Infrasound to determine its effects on astronauts exposed to the low frequencies produced by rocket engines. It was discovered that infrasound at certain levels produce headaches, gagging, coughing, visual distortion, changes in respiratory rhythm and post-exposure fatigue.

However, directing infrasound is difficult because of its long wavelength and the person activating the weapon may be affected by the sound as well.

Ultrasound has been studied for military and law enforcement applications as a non-lethal crowd control tool. A device called a squawk box emits two slightly different, intolerably high-pitched ultrasound frequencies which when combined in the human ear cause intense pain.

The range of these weapons is relatively short and the opportunity for permanent hearing damage make them at this time an unviable option for law enforcement use

Chemical Incapacitants

Chemical incapacitants may be the most effective less lethal systems being developed, but are also the most controversial. A drug called Alfentanyl which, has been used in hospital operating rooms for years, is a surgical anesthetic and a highly potent central nervous system depressant that could be very effective in restraining a suspect. Another drug being researched is Lofentanyl. This drug has a higher dose safety then Alfentanyl and can bypass any other drugs that are already in the suspects system. Lofentanyl will incapacitate a suspect for one to two minutes with no side effects.

A dart delivery system has been studied for these drugs however an effective method of launching the dart has not been found.

Oleoresin Capsicum (OC)

Oleoresin Capsicum or OC is perhaps the most widely used of the modern less lethal weapons available to law enforcement. OC has proven effective on suspects who are under the influence of drugs or alcohol as well as those suffering from mental illness. OC works on both humans and dogs. It can be delivered without contaminating the officer and has a relatively short life and easy clean up.

OC can be delivered in a spray, or foam, from a fogger or shot in a ball from a gun similar to a paintball gun.

OC is an inflammatory found naturally in hot peppers. When a suspect is sprayed with OC his eyes will involuntarily shut and he will have shortness of breath. His eyes, throat and skin the OC comes in contact with will feel an intense burning sensation. The suspect may cough, become nauseous, uncoordinated and feel disoriented.

Extensive studies of OC conducted by the FBI and the United States Army Chemical Research and Development Center have shown that OC poses no harmful side effects cancer risks or other long-term health risks.

OC is also inexpensive and does not require extensive officer training and there is a successful history of the Courts upholding the use of chemical irritants to restraint suspects. OC was one of the first devices to meet all of the parameters for less lethal weapons set by the National Institute of Justice in 1991.

Less Lethal Projectile Weapons

Projectile weapons include 12 gauge beanbag rounds or flexible batons, ballistic bags and rubber or wood bullets. These weapons are general fired from a standard 12 gauge

shotgun a 37mm gas gun or a 40mm grenade launcher. The purpose behind these weapons is to stun and temporarily incapacitate the suspect. These rounds if fired at too close range can easily be fatal, or cause rupturing of internal organs, lacerations and broken bones.

The most commonly used of these weapons is the beanbag round. It is a lead shot filled fabric bag designed to be non-penetrating and is intended to deliver its energy over a large area. On impact the bag collapses and delivers a solid blow much like punch from a boxer. The beanbag round can also be used as a marking round. A marking round is the same as a standard round except it also carries a dye. Upon impact, dye is splattered across the target, making a suspect that does manage to get up and run much easier to locate.

Tasers

Tasers are being used by about 5200 law enforcement agencies across the United States and more departments are going to the Taser every day.

Tasers are handheld devises that shoot two probes attached to wires that extend up to twenty-one feet. Once the probes are in place in the target the Taser emits a peak shock of 50,000 volts of electricity for five seconds. The current can penetrate clothing up to two inches thick. The current overwhelms the central nervous system and incapacitates the target. The newer model Tasers, are powered by two lithium batteries.

When compared to the parameters for less lethal weapons set down by the National Institute of Justice the Taser passes the test.

It improves on several methods of restraining suspects such as the use of batons, and it does not overburden the officer. The Taser is small enough to be worn on a officers duty belt and is easily reloaded. It costs about $400.00 per unit and an officer can be trained to use the devise in one training session. Tasers are small enough and inexpensive enough so they can be carried by all officers on a shift and do not require dedicated manpower. The liability issues surrounding the Taser are favorable. The Taser was developed in 1974 and many law enforcement agencies have been using them for more then fifteen years. In all that time not one death or serious injury has been linked to the Tasers. Concern that Tasers may be used inappropriately by some officers can be calmed by a microchip. Every Taser is equipped with a microchip that records the dates and times the weapon is used. The latest versions, even record the duration of trigger pull when the device is used. Many agencies require a written report whenever the device is used detailing the reasoning behind the use.

The last requirement is that the technology has to work. Taser International's research shows that the Taser is about 90% effective. Failures were usually the result of bad batteries or one or more probes missing the target,

Seattle, Washington Police began using Tasers in 2001. In 2003 Seattle did not have a single officer related fatal shooting for the first time in fifteen years. Police in Portland Oregon carry Tasers and over a ten-month time frame in 2002 officers used them 595 times. After looking into the incidents in which the Tasers were used, it was found that 25% to 30% of those incidents met the criteria for deadly force. Phoenix Arizona Police reduced the number of officer related fatal shootings in 2003 by 54%

DISCUSSION/CONCLUSSIONS

This research just scratched the surface of many less lethal and non-lethal weapon systems available or in development today. As technology increases so will the options for law enforcement. Many of these systems are not practical for all agencies some are not practical for any agency. The goal is to locate a less lethal system that works, is easy to use and is inexpensive. One that will stand up to the test of the court systems and be accepted by the community it is being used in. There is no question that less lethal systems have a place in law enforcement and failure of a municipality to provide officers with a less lethal option is irresponsible. A lack of a less lethal system can easily lead to rapid escalation on the force continuum ladder as well as unnecessary officer injuries. When officers are provided more options and the training that goes with these new options, citizen complaints against officers should decline.

RECCOMENDATIONS

Police officers on patrol need an intermediary force option between empty hand force and their firearm. The Taser appears to be the path of choice for a great number of police agencies, which are abandoning collapsible batons and OC spray and going strictly with the Taser. However, relying on one system could be cause for concern. Because the Taser is becoming such a popular option and has performed very well it is also drawing more attention from watchdog groups such as Copwatch as well as Amnesty International. Deputy Executive Director of Amnesty International Gerald LeMelle, in a

2003 Dallas Morning News article, called for a moratorium on the sale of Tasers until more testing is done on the devices effects on the body. " We would like to see proper testing and strict guidelines," he said. LeMelle went on to say that his organization fears Tasers will be used as an instrument of torture.

There are a small number of disputed cases of death after a suspect was struck with a Taser. In none of these cases was the Taser determined to be the cause of death. In some of the cases the death occurred up to ten days after the Taser hit.. However, anti- police mob mentality has never let the facts get in the way of an opportunity to hamstring effective law enforcement. An unrelated death after deployment of a Taser, the resulting court action and appeals, gavel to gavel cable news coverage and then a ruling from a court such as the Ninth U.S. District in California and Tasers are no longer an option for your department. Unfortunately prior to the ruling it was your only less lethal option. A better choice may be to continue to train with the batons and OC while supplementing the officers arsenal with the Taser. With proper training, well written policy and an understanding of where each tool fits on your departments force continuum an officer effectiveness and safety will only be enhanced.

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TABLE 1

Assaults on law enforcement officers
1993-2002

YEAR	TOTAL VICTIMS	FIREARMS	PERSONAL WEAPONS	CUTTING INSTRUMENT	OTHER WEAPON
1993	62,933	3,880	50,412	1,486	7,155
1994	64,967	3,174	53,086	1,510	7,197
1995	57,762	2,354	47,638	1,356	6,414
1996	46,608	1,878	38,790	871	5,069
1997	52,149	2,110	43,268	971	5,800
1998	60,673	2,126	50,034	1,098	7,415
1999	55,971	1,772	45,640	999	7,560
2000	58,998	1,749	47,502	1,015	8,132
2001	57,463	1,841	46,221	1,168	8,233
2002	58,066	1,889	**46,795**	1,056	8,326
TOTAL	575,590	22,773	469,386	11,530	71,301

Source: U.S Department of Justice Uniform Crime Reports

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"ELECTRO-MUSCULAR DISRUPTION WEAPON" A NEEDS BASED STUDY ON FILLING THE GAP BETWEEN THE IMPACT WEAPON & LETHAL FORCE

E.M.U. SCHOOL OF POLICE STAFF AND COMMAND

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An applied research project submitted to the Department of Interdisciplinary Technology as part of the School of Police Staff and Command Program
September 19, 2003

ABSTRACT

This paper will review the current use of force options available to police officers of the Traverse City Police Department (TCPD). The paper will focus on the gap in the options available between "Intermediate Weapons" and "Deadly Force."

In 1994, in response to public pressure, the TCPD moved the Lateral Vascular Neck Restrain (LVNR) from the level of hard empty hand control to the level of deadly force. The loss of the LVNR as a control technique to control resistive behavior left a gap in the option of available control techniques. This has led to a significant change in training and tactics for confrontations with resistive subjects. Officers no longer have the option of close contact techniques to control resistance without risking injury to themselves or the resisting subject.

In 2001, the TCPD added a "less lethal" bean bag to their options to control resistive behavior. Currently, the TCPD uses a bean bag developed by "Def Tech" which is fired from a 12 gauge shotgun. Although the bean bag has added one option in filling the gap between the impact weapon of lethal force, the bean bag has serious limitations. Since 2001, the deployment of the bean bag gun has proved to be very slow, and require a tremendous amount of pre-planning to be deployed effectively.

The purpose of this research is to explore and demonstrate the effectiveness in which other agencies have used the Electro-Muscular Disruption (EMD) weapon (Taser) since the early 1980's. The Los Angeles Police Department (LAPD) was the nation's first agency to use EMD's, and today over 3,000 agencies nationwide use EMD's. This research will show how EMD's can be an excellent tool to fill the gap between the ASP and lethal force. EMD's have proven to be a less-lethal option that is a safe, economical tool that can be deployed quickly in a rapidly developing non-lethal situation.

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INTRODUCTION

Many police use-of-force situations are sudden close-contact situations requiring immediate, instinctive response. Other situations begin as "standoff" situations (with time for planning and maneuvering) but change to immediate-response situations if the suspect increases resistance, if officers approach the suspect without formulating a plan, or if officers do not take aggressive actions to control the suspect before the standoff situation deteriorates (Meyer, Nonlethal Weapons, p. 38).

Force may be used to make an arrest, prevent escape, or overcome resistance. Traverse City Police Department officers are formally trained to respond to a suspect's actions by escalating or de-escalating force using the following tactics, which are listed according to the perceived level of severity as set forth in current training material:

1. Officers presence or verbal direction, which is characterized as identification of authority such as uniform presence or identification as a police officer. Verbal direction directing the suspect to comply for arrest or to control the subject's movements. The use of restraint devices is also considered to be included in this level of officer response.
2. Compliance control/soft empty hand control, characterized as soft empty hand techniques such as joint rocks, touch pressure and pain compliance techniques.
3. Physical control or hard empty hand techniques, characterized as striking action or takedowns.
4. Intermediate controls with intermediate weapons (i.e., impact weapons).
5. Deadly force, characterized as any force used by an officer that may result in great bodily harm or loss of human life (Siddle, 2002).

Ideally, an officer adjusts the level of force in response to the changing levels of the suspect's resistance, all in an effort to quickly overcome that resistance in a manner calculated to minimize injuries to all parties.

Yet there remains a large void for officers between the use of impact weapons and lethal force. Police officers are increasingly being called upon to resolve dangerous situations outside conventional training and technology. These are often incidents that challenge traditional problem solving techniques. Those who call for police assistance while attempting suicide and other non-compliant armed subjects who do not create a direct threat are increasingly common today.

Historically, officers engaged in such tactical dilemmas had few options between verbal challenges and deadly force. If the suspect ignored their commands and deadly force was not justified, officers faced a very dangerous and uncertain situation. Standard, "less lethal" tools like batons and pepper spray are of limited practical use. Closing the distance to use either is illogical because it requires officers to be in close proximity to the suspect and his weapon, greatly increasing the danger involved. This officer-created jeopardy frequently has a negative and potentially fatal impact on both sides of the badge. American policing by long tradition has encouraged officers to lay their lives on the line. Meritorious recognition is often given to those who consciously disregarded their own safety. Unfortunately, such awards occasionally follow police performance of what was unsafe, illogical and outside of the policy and training.

Officers are not trained to engage armed suspects with batons because it is too dangerous to move within the range needed to use the baton. An officers then might be compelled to use deadly force to stop the threat that was created by moving too close to the armed subject. Those officers frequently become the focus of civil or criminal processes, which demand an accounting

for their actions that created the need for deadly force without adequate justification. Compounding the problem is the unfortunate reality that the shooter is often not the endangered officer. He has often simply arrived as a backup, perceived a fellow officer to be in imminent danger and reacted. It matters little that the endangered officer himself failed to perceive the threat. Incases such as this, proving that we are our brother's keeper often comes at a high price. Departments can take steps that will reduce the confusion and indecision officers face in these incidents that will positively contribute to their safe resolution.

Some see non-lethal weapons as shooting avoidance tools. The concept of using non-lethal weapons to reduce the number of shootings by police is grounded in the belief that, in some situations, non-lethal weapons could control a suspect early in the confrontation, before an unarmed but resisting suspect has the opportunity to become armed and attack the officer. Also, a suspect who is armed with less than a firearm (for example, a knife, bottle or club) could be "zapped" with a non-lethal weapon before the suspect could attack. Clearly, officers need a non-lethal tool at their immediate disposal which can be used with confidence to stop dangerous and resistive behavior.

BACKGROUND AND SIGNIFICANCE

On March 5, 1991, police officers from the LAPD encountered a combative subject by the name of Rodney King. King had been fleeing from police, and was suspected of being under the influence of narcotics. Officers were unable to control King, and after using several control tactics, including strikes with department issued PR24 night-sticks, the King case became the nation's most scrutinized case of police brutality to date. Today, a non-lethal weapons is widely

available to law enforcement agencies that could be deployed to de-escalate situations like the King case, and avoid such unwanted police brutality scrutiny.

The TCPD currently has no tools or tactics available to officers to fill the gap between "intermediate weapons" and "lethal force." The Electro-Muscular Disruption weapon is currently available to fill the gap. The EMD has been tested extensively with a great deal of success and safety. Research and statistical data will demonstrate the overall effectiveness of the EMD and will provide sound evidence to show its capability in filling "the gap."

LITERATURE REVIEW

The LAPD was the first larger agency in the nation to test, use and evaluate EMD's. The LAPD still uses EMD's today and has documented and tracked thousands of cases involving combative suspects and the use of EMD's. An LAPD report on its 1980 field tests stated that "TASER completely and immediately incapacitated violent PCP suspects, who were then arrested without injury to themselves or the officers." (LAPD Suspect Control Device Progress Report, p.10). These findings were also extensively documented in 1980-81 by The Los Angeles Times, The Daily News, Law Enforcement News and Police Magazine.

It has been widely speculated that TASER can induce a heart attack, cause burns, or cause electrocution. This speculation is likely based upon human fear of electricity and lack of knowledge about different types of electrical currents and their effects upon the body.

The literature cites seven cases where a suspect died after the TASER was used. However, medical authorities do not believe that TASER was the cause of death in six of these cases, and the authorities argue over whether it was a contributing factor in the seventh. A 1987 article explained:

Since 1983, seven people have died after police used a Taser on them. In all cases, the victims were on drugs and died of cardiac arrest. The county Coroner's Office had said that the Taser contributed to death in only one of the seven cases… Dr. Eric Koscove of County-USC Medical Center, who researched the effects of the Taser, questioned the coroner's finding and said he has found the device relatively harmless (Britt, sec. A).

PROCEDURES

As previously discussed, the LAPD was the first to incorporate EMD's in their repertoire of tools available to combat non-lethal resistive behavior. The LAPD has also documented more uses and outcomes from the use of EMD's than any other agency in the U.S. For this reason, much of the research results and statistical data complied in this paper comes from the LAPD's documentation of actual uses of EMD's as a non-lethal weapon.

Clearly EMD's have evolved tremendously since the early 1980's, and therefore the world wide web was used extensively to show how modern EMD's work and their current engineering and effectiveness.

There are literally hundreds of non-lethal weapons available to law enforcement agencies today, however, current medical research and statistical data from thousands of different non-lethal options suggest that the EMD's available today are the safest, most reliable and economical options available today. The EMD's available today are closing in on the effectiveness of the "phasers" used in the futuristic show Star Trek.

DISCUSSION

It is clear that there is a lack of tools available to officers of the TCPD in dealing with violent, combative subjects who exhibit levels of force less than deadly. Although there is a myriad of less lethal tools available today, most are untested or rely on some type of blunt force trauma.

After years of use and testing, the LAPD has compiled statistics which show how EMD's stack up to other available options to combat resistive behavior. Although the LAPD documents

the effectiveness of tools other than those available to the TCPD, (i.e., flashlight), the statistics outlined here will be limited to those common to the LAPD and TCPD.

During the first six months of 1990, the LAPD documented 1129 uses of force which fell between hard empty hand control and lethal force. 902 strikes were documented, with officers being injured in 14% of the cases and suspects being injured in 51% of the cases. 86 swarm tactics were used with officers being injured in 15% of the cases and suspects being injured in 23% of the cases. 24 cases of chemical spray were documented, with no cases of injury to officer or suspect. 117 taser cases were documented with no cases of injury to officer or suspect (Meyer, Nonlethal Weapons, p. 38).

Table 1.1

Totals of Injuries (Major and Moderate Combined),
By Force Type, if 1,129 Reports Were Analyzed

Force Type	All Classes	Total of Major/Moderate Injuries	
		Officers	Suspects
Baton	307	45 (15%)	188 (61%)
Karate Kick	109	13 (12%)	32 (29%)
Punch	49	15 (31%)	29 (59%)
Miscellaneous	437	68 (16%)	207 (47%)
Swarm	86	13 (15%)	20 (23%)
Chemical Spray	24	0 (0%)	0 (0%)
TASER	117	0 (0%)	0 (0%)
Total	1129	154 (13%)	476 (43%)

Given that there are no level of force options available under TCPD guidelines between impact weapons and deadly force, we must examine and compare the safety of options available and less lethal tools available. The findings of the LAPD clearly show that both hard empty hand techniques and impact weapons cause injury to officer and suspect in a substantial number of cases, while chemical sprays and EMD's cause no injuries.

The findings are so strong, in fact, that they suggest that non-lethal weapons cause no injuries when compared to conventional tactics.

There is a clear implication from these findings that police officers should use non-lethal weapons as the first resort during violent confrontations which require using sufficient force to cause the suspect to fall to the ground.

In 1977, a police officer was disarmed and shot in the face by a naked man who was under the influence of phencyclidine (PCP), an illegal drug reputed to give some users "super-human" strength. That same year, four police officers responding to a single incident suffered an assortment of broken bones and concussions at the hands of a naked PCP suspect. Another officer shot and killed a naked man on PHP (a PCP analog); the man had twice taken the officer's baton and was about to overpower him. In 1978, a deputy sheriff was disarmed and shot to death in a fight with a PCP suspect (Meyer, "Your Nonlethal Weapons Alternative", 1981).

On January 3, 1979, an emotionally distraught woman was shot and killed when she attacked two Los Angeles Police Department officer with an eleven-inch butcher knife. The officers shot her after repeated verbal efforts and the use of a police baton failed to control the situation. In the wake of that incident, the Board of Police Commissioners directed "continued research into the use of intermediate weapons and/or control devices which have the potential to

significantly reduce reliance upon deadly force." (LAPD The Report of the Board of Police Commissioners Concerning Eulia Love and the use of Deadly Force, 1980, p. 6).

On April 30, 1981, the LAPD adopted the Electo-Muscular Disruption weapon (TASER) as an authorized non-lethal weapon. The LAPD still authorizes and uses EMD's and reports a tremendous success rate with them. Because the LAPD was the first major agency in the nation to use EMD's, much of the research for this paper uses statistical data compiled from the LAPD since 1981.

In order to understand how an EMD weapon effects a person, we must first understand how they work.

We tend to think of electricity as a harmful force to our bodies. If lightning strikes you or you stick your finger in an electrical outlet, the current can maim or even kill you. But in smaller doses, electricity is harmless. In fact, it is one of the most essential elements in your body. You need electricity to do just about anything.

When you want to make a sandwich, for example, your brain sends electricity down a nerve cell, toward the muscles in your arm. The electrical signal tells the nerve cell to release a neurotransmitter, a communication chemical, to the muscle cells. This tells the muscles to contract or expand in just the right way to put your sandwich together. When you pickup the sandwich, the sensitive nerve cells in your hand send an electrical message to the brain, telling you what the sandwich feels like. When you bite into it, your mouth sends signals to your brain to tell you how it tastes.

In this way, the different parts of your body use electricity to communicate with one another. This is actually a lot like a telephone system or the Internet. Specific patters of electricity are transmitted over lines to deliver recognizable messages.

The basic idea of a stun gun is to disrupt this communication system. Stun guns generate a high-voltage, low amperage electrical charge. In simple terms, this means that the charge has a lot of pressure behind it, but not that much intensity. When you press the stun gun against the attacker and hold the trigger, the charge passes into the attacker's body. Since it has a fairly high voltage, the charge will pass through heavy clothing and skin. But at around 3 milliamps, the charge is not intense enough to damage the attacker's body unless it is applied for extended periods of time.

It does dump a lot of confusing information into the attacker's nervous system, however. This causes a couple of things to happen:

- The change combines with the electrical signals from the attacker's brain. This is like running an outside current into a phone line: The original signal is mixed in with random noise, making it very difficult to decipher any messages. When these lines of communication go down, the attacker has a very hard time telling his muscles to move, and he may become confused and unbalanced. He is partially paralyzed, temporarily.
- The current may be generated with a pulse frequency that mimics the body's own electrical signals. In this case, the current will tell the attacker's muscles to do a great deal of work in a short amount of time. But the signal doesn't direct the work toward any particular movement. The work doesn't do anything but deplete the attacker's energy reserves, leaving him too weak to move (ideally).

At its most basic, this is all there is to incapacitating a person with a stun gun – you apply electricity to a person's muscles and nerves. And since there are muscles and nerves all over the body, it doesn't particularly matter where you hit an attacker (AC & SSI Staff, 9/2000).

The two most popular delivery systems of ran EMD weapon in use today are the stun gun design and the taser gun design. Because the stun gun requires the user to make contact with the subject before delivering a shock, it is clearly not the preferred choice for law enforcement.

Taser guns work the same basic way as ordinary stun guns, except the two charge electrodes aren't permanently joined to the housing. Instead, they are positioned at the ends of long conductive wires, attached to the gun's electrical circuit. Pulling the trigger breaks open a compressed gas cartridge inside the gun. The expanding gas builds pressure behind the electrodes, launching them through the air, the attached wires trailing behind. (This is the same basic firing mechanism as in a BB gun.)

The electrodes are affixed with small barbs so that they will grab onto an attacker's clothing. When the electrodes are attached, the current travels down the wires into the attacker, stunning him in the same way as a conventional stun gun.

The main advantage of this design is that you can stun attackers from a grater distance (typically 15 to 20 feet / 4 to 6 meters). The disadvantages is that you only get one shot – you have to wind up and re-pack the electrode wires, as well as load a new gas cartridge, each time you fire. Most Taser models also have ordinary stun gun electrodes, in case the Taser electrodes miss the target.

Some Taser guns have a built in shooter-identification system. When a police officer fires the Taser electrodes, the gun releases dozens of confetti-size identification tags. These tags tell investigators which gun was fired, at what location. Some Taser guns also have a computer system that records the time of every shot.

Are Non-lethal Weapons Really Non-injurious?

The Taser and chemical irritant spray cause pain. The tiny Taser darts sometimes puncture the surface of the skin, resulting in minor pain and bee-sting like wounds (which are usually treated with Band-Aids), and the electrical charge causes pain. Chemical irritant spray causes runny noses, itchy eyes, and a temporary burning sensation. The effects of both non-lethal weapons usually end after a few minutes.

In 1980, the supervising physician of the Medical Services Division, Los Angeles City Personnel Department, wrote that the Taser was "reasonable and feasible and presents no undue risk to the recipient."

In 1985, after the LAPD had used the Taser hundreds of times, a medical journal article by Dr. Eric M. Koscove of the Los Angeles County University of Southern California Medical Center, concluded that "major injuries, either primary to the [electrical] current or secondary to [falling down] have not been reported." (Koscove, p.112).

The LAPD and countless other agencies have documented literally thousands of uses of EMD's since the early 1980's, and to date, the author has not been able to locate any substantial or reliable evidence of dangers associated with the use of EMD's.

RECOMMENDATION

There are few areas of greater concern to police administrators than the use of force by police officers. The very thing that sets officers apart from ordinary citizens is the authority to forcibly restrain someone. This presents modern law enforcement with its most difficult management challenge.

As any police administration knows, the potential for loss inherent in the police use of force is enormous. Aside from the commonly recognized "exposure" of litigation, the use of force related to an incident harbor a significant potential for officer injury. Additional costs associated with the use of force incidents include such things as decreased public confidence in police and undermine in the department moral. From these types of incidents, a number of citizen-based activists groups have developed whose mission is to monitor the police use of force incidents.

Clearly there exists a strong need for management of police use of force through 1) preplanning a use of force program, 2) implementation of a valid use of force policy, and 3) specialized administrative oversight of the use of force incident. At every level management of use of force requires planning, guidance and training. For many years the only training undertaken by many departments on a regular basis was firearm qualification. Society, the legislature and case law have identified such strict criteria for the use of police firearms that many modern police agencies rarely see a shot fired on even a monthly basis.

On the other hand, non-lethal force is utilized on a daily basis during the most routine and mundane arrest situations. These are the use of force incidents in recent times that have generated the greatest controversy and scrutiny in the private sector. Departments are faced with the necessity of providing training and support resources for the use of force activities.

Expenditures for training for handling use of force incidents have increased multifold over the last several years. Departments must manage use of force in a coordinated manner incorporating the critical skill areas of driving, firearms and non-lethal force into a cohesive whole. Continuing in the areas of training for proper documentation and reporting of use of force incidents is necessary to ensure continued public support and minimize potential for litigation and public scrutiny of use of force incidents.

The potential for officer injury is so great during use of force incidents that a department is arguably justified in expending all or at least most of its training and management resources to control the inherent risks in this type of activity. If a department creates a working environment where officers are given the tools and the training to safely and effectively perform use of force related tasks, then a parallel reduction should occur in costs related to litigation. Simultaneously, a well-managed use of force program with appropriate documentation and reporting of incidents should manifest itself in increased citizens support. By focusing on the positively driven motivational factors of officers' safety and survival to drive the training programs, management underscores the importance of proper handling of use of force incidents to its officers. In this way, officers can also be given a personal stake in doing the right thing. Not only because it is the safe way, but it is the right way to do the job.

Yet there remains a large void for officers between the use of impact weapons and lethal force. Police officers are increasingly being called upon to resolve dangerous situations outside conventional training and technology. These are often incidents that challenge traditional problem solving techniques. Those who call for police assistance while attempting suicide and other non-compliant armed subjects who do not create a direct threat are increasingly common today.

Historically officers engaged in such tactical dilemmas had few options between verbal challenges and deadly force. If the suspect ignored their commands and deadly force was not justified, officers faced a very dangerous and uncertain situation. Standard, "less lethal" tools like batons and pepper spray are of limited practical use. Batons require offices to engage the suspect at a dangerously close distance, and pepper spray can take several minutes to completely disorient a suspect.

Law enforcement leaders should encourage officers to use non-lethal weapons as the first resort in situations where it is reasonable and necessary to cause resisting suspects to fall to the ground, whenever the situation allows officers o have a choice. Incident reviewers (supervisors and commanding officers) should ask why conventional force types were used instead of non-lethal weapons.

Moral and legal constraints require officers to use the minimum amount of force which is reasonable and necessary to control a confrontation. It hardly needs to be noted that whatever force types are effective and which result in the least severe injuries to officers and suspects are more reasonable than those which result in greater injuries.

The new generation of EMD's seems to be the best tool available tot date to fill the wide and dangerous gap between the asp and gun. EMD's have proven to be highly effective and safe and are currently very affordable to any progressive agency.

Agencies across the nation, and Canada, have been reporting tremendous success with EMD's, the following is a true story from the Royal Canadian Mounted Police:

> A cow moose and her newborn calf were wandering through the yards of some homes in Faro, Yukon, when the calf got stuck behind a 3-foot chain-link fence that its mother had easily crossed. The cow became increasingly agitated during her unsuccessful attempt to

get her little one up and over the barrier, and the efforts of local police and residents were greeted with angry snorts, growls and at least one charge by the 1,000-pound mother. With no real choice other than shooting both animals, Cpl. Ken Alderson of the Royal Canadian Mounted Police opted to try his newly issued Taser.

Using a greenhouse for cover, Alderson got within range and zapped the cow with the unit's 50,000 volts, which knocked her down instantly. Two other good Samaritans rushed up to the calf and dumped it over the fence, where it rejoined its mother. Alderson then cut the power to the Taser. "And as soon as we let the mother up… the two of them just skedaddled out of there. It was perfect." Alderson told the Whitehorse Star (9/2003, p. 11).

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