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Oleoresin Capsicum: An Analysis Of The Implementation of Pepper Spray
Into The Law Enforcement Use Of Force Continuum

In A Selected Police Department

A thesis

presented to

the faculty of the Department of Criminal Justice and Criminology

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Master of Arts in Criminal Justice and Criminology

by

Lydia Denise Adkins

August 2003

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ABSTRACT

Oleoresin Capsicum: An Analysis of the Implementation of Pepper Spray into the Law Enforcement Use Of Force Continuum in a Selected Police Department

by

Lydia Denise Adkins

This study focused on the use of oleoresin capsicum (OC) as a means of force and also tested the effectiveness of OC.

A medium-size police agency was studied from 1999-2001. The following reports were collected for analysis: excessive force reports, reports of officers injured during arrests, use of hands-on restraint, and use of police baton.

This study revealed an increase in reported incidents of excessive force and a reduction in the number of officers injured making arrests while using various defensive techniques.

Implementing OC into the force continuum remains a solid decision in review of this research. This study has shown oleoresin capsicum to be a safe, effective level in the law enforcement force continuum.

DEDICATION

I would like to dedicate this document to the loving memory of my Mother, Joyce Church, who was my motivator, my source of encouragement, and my best friend. She instilled upon me a sense of strength, confidence, and the knowledge of right from wrong. The wisdom given by my Mother enables me to face great adversities and to achieve many goals.

I would also like to dedicate this work to my Father, Walter Frank “Jug” Church, who always supported me regardless of my choices. Without the love and support of both my Mother and Father, my goals and dreams would have surely fallen short.

Lastly, I dedicate this work to my husband, Todd Adkins, who during my career move pressed me forward to complete my graduate work. I am truly a lucky woman to have such a loving and unselfish man.

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I wish to thank the Department of Criminal Justice and Criminology for their patience with my graduate program while I pursued my dream of becoming an FBI Special Agent. I would like to further acknowledge Sharon Elliott of the Department of Criminal Justice and Criminology who has always been a source of information and encouragement to all students of Criminal Justice at ETSU.

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CHAPTER 1

INTRODUCTION

For as long as humans have walked this earth, there has been an inherent need for someone to keep peace and make decisions about justice. Along with the trials and tribulations of keeping peace and justice comes an awesome responsibility of using force to maintain that balance. Law enforcement officers are faced with performing duties during sometimes violent and life threatening situations and having only moments to decide if using force is necessary and what level of force should be administered.

For years, law enforcement officers had a limited number of choices when apprehending suspects who exhibited violent behavior for reasons such as drug and alcohol abuse and even mental illnesses. During this time, both the officer and the subject were very likely to become injured due to the lack of alternative measures available to safely control a combative subject. With the increased interest by researchers and law enforcement management, police use of force has quickly become a topic of interest.

Law enforcement, with an increased trend toward better training and more professionalism, has begun to follow a force continuum. The continuum presents officers with a series of escalating steps in the use of force that they are required to follow whenever possible (Smith & Alpert, 2000). The force continuum is presented ranging from a lesser degree of force escalating to deadly force. However, police training and general orders of various agencies specify that if a deadly confrontation suddenly presents itself, the officer is not required to use every step of the continuum before resorting to deadly force. The force continuum is based solely on the suspect's behavior.

The officer may move up or down the continuum, skipping several levels if the situation dictates a certain response.

The primary focus of the force continuum will be at the chemical level for purposes of this research. For years, police officers have used chemical agents such as chloracetophenone (CN) and chlorobenzylidene malononitrile (CS) when restraining combative and resistive subjects (Friend, 1995). These chemical agents were found to be ineffective and depended greatly, but not entirely, on distance and temperature. Problems associated with decontamination arose from the use of CN and CS once the agents had been deployed.

Presently, law enforcement agencies choose oleoresin capsicum (OC), more commonly known as pepper spray, as the chemical agent to be carried and used in the line of duty. Oleoresin capsicum, considered an inflammatory agent, is derived from the cayenne pepper plant. Oleoresin capsicum is an organic with an oily resin consistency that enables the product to adhere to surfaces it is sprayed on to (Concepts and Issues Paper, 1995). Some companies that manufacture pepper spray also add an ultraviolet chemical that aids in the apprehension of a fleeing subject after the subject has been sprayed. The subject will emit a “glow” next to an ultraviolet light.

The total effectiveness of OC is not determined by temperature or distance but relies greatly on the inflammatory properties. These properties cause OC to be more effective than the previously used CN and CS on violent, intoxicated, drugged, and mentally ill individuals (Edwards, Granfield, & Onnen, 1997). It is also believed that pepper spray is effective on aggressive animals that police officers encounter while carrying out their duties.

Decontamination from the use of oleoresin capsicum has not posed a problem for law enforcement, unlike with the deployment of CN and CS. The use of oleoresin capsicum does not result in permanent dermatitis, skin depigmentation, or burns (Edwards et al., 1997). Today in law enforcement, pepper spray has become a common tool for officers using force for intermediate situations and has become an alternative to the baton and the use of hands and feet (Friend, 1995).

Statement of the Problem

It was the purpose of this research to determine how effective the implementation of oleoresin capsicum was on reducing citizen complaints of brutality and injuries to officers within a selected law enforcement agency. Law enforcement agencies in the past have suffered greatly because of widely publicized cases of excessive force, such as the 1997 beating death of Arthur McDuffie in Miami, Florida and the beating of Rodney King by officers of the Los Angeles Police Department. The implementation of pepper spray into the use of force continuum for law enforcement agencies across the country hopefully will provide a less than lethal tool to use when a subject is combative. The ultimate idea is to eliminate the unnecessary use of batons, choke holds, or firearms when subduing a resistive suspect. The anticipated result of using oleoresin capsicum will be a lower probability that a complaint be lodged by suspects or others (Friend, 1995).

Agencies must weight the advantages, disadvantages, and overall effectiveness of using OC. The short and long term medical effects of using a chemical agent on humans against and the risk of in-custody death must also be weighted by police agencies. Liability to a law enforcement agency is always a prime concern when exploring a new use of force technique. Any technique or tool that may enable police officers to safely

control and apply handcuffs to a combative suspect will be widely received by law enforcement agencies.

Law enforcement agencies spend millions of dollars every year on training police officers. Training academies provide vast information regarding the topic of use of force, primarily deadly force. Each element of the force continuum is examined and studied in a classroom and then the officers must physically exhibit their acquired knowledge of the training. Many law enforcement agencies require that their police officers be sprayed with oleoresin capsicum in the facial area as part of the qualification process. The logic behind this procedure is for the officer's initial exposure to pepper spray to be within a controlled environment and not on the street.

There is limited information on police use of force statistics and the reasoning for this is the lack of a national reporting system on the subject of police use of force. There are no states that maintain a complete database or standard for collecting use-of-force data (Alpert & MacDonald, 2001). Many attempts in the past have been made to organize a nationwide database on the subject of police use of force. The International Association of Chiefs of Police (IACP) assisted in a study that took place in Virginia to develop software for reporting force used by officers and requested all agencies to submit data regarding police use of force. Over a three-year period, the IACP has received approximately 50,000 use-of-force reports per year submitted by approximately 300 agencies. The results of the most recent reports state that force was used 3.41 times per 100,000 calls for service in 1997 (Alpert & MacDonald). However, the attempts of the IACP to create a nation-wide system for use of force reporting is not being used by all law enforcement agencies. Therefore, conclusions regarding the ability of OC to reduce

incidents of police brutality, citizen complaints, and/or injuries to officers cannot be made used when so few agencies submit reports.

Purpose of the Research

This research focused on law enforcement officers making arrests of combative, resistive individuals. When the decision is made to place an individual under arrest, the officer does not know if the arrest will be met with resistance. Law enforcement is constantly evolving with innovative techniques to assist officers in safely enforcing the laws. The push for professionalism within the law enforcement field has increased with departments becoming accredited and rising to a higher standard of policing.

The ultimate goal in police work is to enforce laws, protect the public, preserve life and property, and to achieve this using the least amount of force necessary. Currently, law enforcement officers use better equipment and with far more guidelines than officers did 10 to 20 years ago. But, this type of advancement has enabled officers to stay ahead of the curve when dealing with the criminal element.

Often enough, police officers are called upon to handle situations involving combative, resistive individuals who are highly intoxicated and/or under the influence of narcotics. These situations many times are or become violent and life-threatening for the officers and others at the scene. The police officer has taken an oath and has a duty to perform whatever the circumstance might be regardless of the danger involved. Therefore, law enforcement officers have a proven need for the best tools and techniques available in order to accomplish their goals.

Occasionally in the field of police work, a tool or technique will emerge that has a drastic influence on making arrests safer, not just for the officer, but for the arrested suspect as well. Prior to the onset of oleoresin capsicum, police officers complained that

the product known as “mace” issued to them was worthless and ineffective. An officer referencing mace was heard stating, “This stuff just takes up space on my gun belt.” However, the development of the pepper-based oleoresin capsicum for law enforcement use made approaching combative, resistive subjects easier and safer for all those involved. Once officers deploy oleoresin capsicum, they could now safely approach the subject and apply restraint devices to ensure no one receives injuries.

Oleoresin capsicum has been placed at a low level on the law enforcement force continuum and has virtually replaced the use of the baton on combative subjects. This should ultimately result in fewer complaints regarding excessive use of force because the effects of oleoresin capsicum are temporary and the effects of a baton are often times permanent.

The foremost efforts of law enforcement officers are to deter crimes, but when that fails, officers then need every accessible means of safely apprehending and bringing to justice those who disregard the law.

Hypotheses

Based upon the review of the literature, it was hypothesized that the use of OC would decrease incidents of reported police brutality and officer injuries during arrests. Therefore, the following null hypotheses were tested:

- Ho1: There will be no significant difference in the number of reported incidents of police brutality before and after implementation of OC spray.
- Ho2: There will be no significant difference in the number and extent of officer injuries during arrests before and after implementation of OC spray.

Limitations of the Study

As with any study, some limitations are likely to occur. Historically, police agencies have not been concerned with the collection of statistical data, limiting the scope of research conducted.

Law enforcement agencies are for the most part inundated with report writing and documentation. With the trend of onboard computers in patrol cars, police officers can better document service calls and statistical data should become easier to acquire. Difficulty was met when statistics and data for the early late 1980s and early 1990s were requested. The large movement of law enforcement agencies becoming accredited has proven to be beneficial for researchers in the field of criminal justice. The law enforcement agencies that have become accredited are held to a higher standard of professionalism and, in order to maintain the accredited status, must produce statistical documentation on every facet of their department. However, prior to the application of accreditation, most police departments maintained little statistical documentation other than arrests. The selected law enforcement agency for this study received accreditation in 1992 and has, since 1991, maintained data on use of force, officer injuries during arrests, and complaints of police brutality.

Gathering data by collecting reports that contain documented information may not provide the most accurate information available. However, when individuals complete survey information, researchers also employ a risk that they are not receiving truthful and accurate information. As for collecting completed reports, the law enforcement officers filing the report did so not for the purpose of research, but as part of their job, and as a document that they may be called upon to testify to at a later date. The risk incurred by collecting data from completed reports is that the officers were either not truthful in

reporting or failed to be complete with the information that was provided. The information and findings reflected by this study take into consideration that the reports gathered may not be completely accurate.

Finally, the data obtained from one local law enforcement agency may not be appropriate to draw conclusions about other law enforcement agencies. External validity is always a concern with one sample studies such as the present study.

CHAPTER 2

REVIEW OF LITERATURE

Force Continuum Ideology

The police use-of-force continuum was developed so there would be a uniform understanding of what level of force to use and under what circumstances that force would be administered. The idea of a force continuum centers on safety considerations, with close attention to liability factors that concerns both officers and police agencies. Therefore, approaching each situation using the lowest level possible to achieve the desired results is the ultimate goal of the force continuum (Hunter, 1994).

Historically, the force continuum has been made up of five separate levels of force, escalating to the next step. Traditionally, the continuum appears as follows:

- 1). Physical presence
- 2). Verbalization
- 3). Physical contact
- 4). Hand-held impact weapons
- 5). Lethal force.

The above model accurately reflects the methods of force that have been available for law enforcement officers in the past; however, it should be modified to adapt to the levels of force that is presently available for officers. The latest use-of-force continuum should include two additional levels and appear as follows (Hunter, 1994).

- 1). Physical presence
- 2). Verbalization
- 3). Less than physical force (neutralizing agents)

- 4). Physical contact
- 5). Less than physical force (neutralizing agents)
- 6). Hand-held impact weapons
- 7). Lethal force

The two additional levels of force afford the officers an added degree of flexibility while dealing with a resistive suspect before they make any physical contact with subjects or after initial physical contact and before the use of an impact weapon has been used.

Levels of Force

The levels of force that are given previously are not uniform for all law enforcement agencies throughout the United States. Agencies use-of-force continuum may vary in some degree about the type of force they will allow officers to use and what type of equipment the officers may carry.

Officer presence placed at the first level of force is widely accepted and is the lowest level of force on the continuum. The mere presence of an officer in uniform projects command of the situation and this level should be used before progressing to another level of force (Use of Force – Non-Deadly and Deadly, 2001).

The second level of force that is largely recognized by most law enforcement agencies is the use of verbal commands and dialogue. When the presence of a uniformed officer fails to resolve the situation, the officer should then use verbal commands to clarify information and to instruct those individuals involved on what they should do to comply. Mediation, advice, and problem solving skills should be used to assist in resolving the situation (Use of Force – Non-Deadly and Deadly, 2001).

Most law enforcement agencies agree that the next level of force is physical contact, otherwise known as compliance holds and sometimes referred to as empty hand (soft) techniques, meaning there are no weapons held in the hands. If the first two levels of force do not achieve their objective, the officer must advance to level three and attempt a physical contact with a resistive subject. There are various techniques used to subdue subjects. Officers may employ takedowns, pain compliance techniques, and the “come-alongs.” The goal is to use the least amount of force necessary (Use of Force, 2002).

The next level of force agreed on by some agencies is the use of a chemical agent such as oleoresin capsicum. When the first three levels of force fail to resolve the situation, the officer is authorized to use the issued chemical agent to safely gain control of the subject. However, there are still law enforcement personnel who are not authorized by their agency to deploy a chemical agent. Those numbers are changing rapidly and are reflected in a survey showing that in 1997 nearly all sheriff departments authorized the use of non-lethal weapons by officers. From 1993 to 1997, the percent authorizing pepper spray increased from 56% to 87%, and for departments serving a population of 500,000 or more the percentage increased from 72% to 93% (Reaves & Goldberg, 1999).

Many agencies have mechanical compliance or empty hand (hard) listed on the continuum, following the use of a chemical agent as the next level of force. This level of force is used to hold or restrain a combative subject and includes techniques to render the subject immobile. The assistance of a police baton such as a PR-24 (protect and restrain) or an ASP baton may be used to effect the holds. The batons are not intended to be used as a striking instrument at this point in the continuum (Use of Force, 2002).

The force continuum continues to what is known as "hands and feet impact." This method involves the officer using various techniques such as distraction techniques and leg sweeps directed to designated areas of the anatomy (Use of Force – Non-Deadly and Deadly, 2001). Some agencies at this level allow the officers to use their baton to execute holds and to render the subject immobile.

The seventh step of the continuum and the step that has come under much scrutiny is the use of an impact weapon, referred to as the police baton. The impact baton shall be used as defensive equipment and should be used only as the threat to the officer or others increase and when the preceding levels of the continuum have been unsuccessful (Use of Force – Non-Deadly and Deadly, 2001).

The eighth step some law enforcement agencies adopted is the use of less than lethal munitions. The munitions being deployed are distraction devices, tear gas canisters, "bean bag" impact rounds, hard rubber ball, or wooden dowel rounds (Use of Force – Non-Deadly and Deadly, 2001).

Yet, fewer agencies sanction the use of the Lateral Vascular Neck Restraint, which is a physical technique where the officer may acquire a combative, resistive subject from behind and manipulate the subject into a sophisticated "choke hold", rendering the subject momentarily unconscious (Use of Force, 2002).

The final level of force on the force continuum is the use of deadly force. An officer is justified in the use of deadly force as self-defense or in the defense of others from serious bodily harm or immediate death (Use of Force – Non-Deadly and Deadly, 2001). The steps comprising the force continuum have ultimately ended with the highest level of force a police officer will ever have to use – deadly force.

One key factor pertaining to the force continuum is that an officer is not mandated to follow the continuum step by step during every confrontation that arises. Officers respond to situations that change rapidly and will not permit time for advancement up the continuum. For example, the officer might arrive at the scene of a domestic disturbance involving a husband and wife arguing. The officer then uses the first step by the mere presence of the uniform identifying a law enforcement presence. The officer uses step two of the continuum when verbal commands are given to the arguing subjects. The officer then realized that the wife had reached into the kitchen and obtained a knife and was quickly advancing toward the officer with it raised above her head. At that time, the officer is left with only one option, which is deadly force, skipping all the levels between verbal commands and deadly force. The force continuum is flexible in that the officer may escalate up the scale; however, if the need arises, the officer may then use a higher level of force to gain control and maintain order.

OC Spray in the Force Continuum

The use of oleoresin capsicum by law enforcement has become widely accepted by most agencies and has become part of their force continuum. The organically based inflammatory agent that is derived from cayenne peppers, oleoresin capsicum's ingredients are generally 90 % to 95 % inert, thus making it safe for use at a very close range (Hunter, 1994). Injuries to officers and the subjects being arrested have been at the center of attention for law enforcement agencies throughout the United States. To help solve that problem, departments have sought answers in technology involving less-than-lethal weapons (Edwards et al., 1997). Oleoresin capsicum is one measure of less-than-lethal force that effectively addresses the issue of officer/citizen injury (Edwards et al.).

Up to the present time, law enforcement had no mid-level use of force that enabled them to gain control of a combative subject without engaging in some type of hands-on force. Oleoresin capsicum has filled that gap on the law enforcement force continuum.

When law enforcement officers are introduced to a new weapon or technique approved by their department, guidelines and procedures are furnished along with training on that particular weapon. The Baltimore County Police Department's (BCPD) procedures for deploying OC spray was studied by the National Institute of Justice and under the following situations, the BCPD officers may use OC spray when:

1. A resistive subject has not complied with the officer's verbal commands.
2. A resistive subject has been informed that the use of OC is imminent.
3. The officer is preparing to engage hands-on tactics to defend against the aggressor.
4. The officer is confronted by an aggressive animal.

As with most agencies, the Baltimore County Police Department iterates the fact that oleoresin capsicum is not a substitute for a firearm (Edwards et al., 1997).

Before any piece of equipment can be issued to law enforcement personnel, careful consideration is given to the cost effectiveness of the new equipment. All law enforcement agencies operate within strict budgets and must make every effort possible to get the most for their dollars spent. With law enforcement, there are always new innovations and "gadgets" marketed that are aimed at making the job of a police officer easier and safer. However, many of the advertised innovations have been proven ineffective and inefficient for police work. Police departments are looking for equipment that will be dependable with minimal repair. Agencies are also concerned with the cost of training the officers and also the cost of replacing the equipment when needed.

Oleoresin capsicum has become that piece of equipment. An attractive aspect of pepper spray is its affordability. The initial cost for a canister of pepper spray may range from \$10 to \$25, according to the quantity that the agency purchases. The training in the use of pepper spray will usually consist of a minimum of four to eight hours of instruction per officer (Hunter, 1994). The training can be accomplished in house by a certified instructor of each department; therefore, travel cost and tuition for training are not necessary and will be cost-effective for the law enforcement agency.

Implementing OC into the Force Continuum

Very often, law enforcement agencies have fallen under extreme scrutiny by the press and the public as well. The Rodney King case that occurred in Los Angeles, California handled by the Los Angeles Police Department (LAPD) brought about a large push in the direction for a non-physical type of force that officers could have available as an alternative to the police baton. The use of oleoresin capsicum reduces the amount of physical contact the officer will have with a combative subject, therefore reducing the number of injuries to the subjects and officers (Morgan, 1999). The use of oleoresin capsicum should then reduce the number of excessive force complaints and cut down on workman's compensation claims (Norwicki, 2001). These are attractive qualities for any law enforcement agency where liability and overhead costs are always a concern.

With the implementation of oleoresin capsicum to the law enforcement force continuum came many hurdles to be crossed. The biggest hurdle was the selection process. Police agencies were taxed with finding a pepper spray that was reliable and effective, and because most delivery systems for pepper spray use alcohol, there was concern about flammability (Morgan, 1999). Some departments consulted their local fire departments, insurance carriers, municipal officials, and city attorneys as to the selection

process. Considerations were given as to the type of system to be purchased and how the departments would incorporate the new tool (Morgan). The primary use of the pepper spray will be by police officers for the purpose of behavior modification, making isopropyl alcohol an appropriate carrier for patrol officers. However, a non-flammable carrier might be a better selection for a tactical/SWAT team where saturation might be necessary (Morgan).

Other considerations during the selection process are the delivery patterns. There are five basic patterns:

1. cone shaped spray
2. fogger spray
3. stream
4. splatter stream
5. foam

The cone and fogger systems are most effective on the respiratory system. The foam method reduces secondary exposure to OC spray, but it is virtually ineffective when sprayed into a head wind or a crosswind. The stream and splatter stream work well in the wind but do not provide very effective respiratory effects (Nowicki, 2001). Some officers will elect to carry two variations of spray as long as approval from the law enforcement agency has been granted.

The FBI has implemented two models of oleoresin capsicum that are used in the field by their agents. The first is the undercover model (Z-205) with a maximum range of 6 FT. and a spray width of 2 FT. The standard duty model (Z-305) has a maximum range of 15 FT., which is considerably more than the undercover model, and the width of spray is 6 FT. (Weaver & Jett, 1989).

Oleoresin Capsicum

Oleoresin capsicum (OC) has generated extreme interest and has subsequently become a popular less than lethal option for many law enforcement agencies (Onnen, 1993). Oleoresin capsicum appears to have all the components of a safe alternative to “hands-on” use of force and is safe, effective, and relatively inexpensive. Oleoresin capsicum may reduce the potential for excessive force complaints, civil litigation, and injury-related expenses (Onnen).

The use of oleoresin capsicum has also been widely accepted for use in correctional institutes across the United States. Correctional officers employed to keep some of America’s most dangerous criminals behind bars do so without the aid of a firearm by their side. The correctional officers have close contact with inmates and are always outnumbered, making the officers rely heavily on training and defensive tactics. Mace and tear gas have not been as effective as the use of pepper spray on combative inmates and eliminating countless number of excessive use of force complaints when correctional officers must subdue inmates.

It was in the early 1990s that OC spray and hand-held stun devices were introduced into various detention facilities. In the past, statistics have revealed that both inmates and law enforcement officers were more likely to suffer injury with the stun device than with pepper spray, stun devices only produced slightly lower injury rates in the jails than weaponless, hands-on tactics (Smith & Alpert, 2000).

The Institute for Law and Justice (ILJ) conducted a survey in 1992 of US law enforcement agencies regarding their use and experiences with a variety of less-than-lethal weapons. There were 378 police and sheriffs’ departments that responded to the survey. The survey asked agencies to comment on the effectiveness of the weapons that

they employed. The survey found that telescoping batons and OC spray were the most effective among the commonly used police weapons at subduing resistive suspects, and those weapons also generated a small amount of citizen complaints and were judged to be relatively safe to both officers and citizens. Overall, oleoresin capsicum was said to be the safest and most effective of all of the weapons listed on the survey (Smith & Alpert, 2000).

The intended effects of chemical agents are to distract, disorient, disrupt activities, disperse, and disable combative, resistive subjects (Weaver & Jett, 1989). These are the five objectives that law enforcement officers are attempting to achieve when they deploy oleoresin capsicum.

Chemical Composition of OC

When examining the chemical characteristics of oleoresin capsicum, there are terms that will become more familiar as this section progresses, terms such as: capsaicin, capsaicinoids, and Scoville Heat Units (Christensen & Frank, 1995). Also, note that because oleoresin capsicum extracts contain a multitude of natural compounds at irregular concentrations, there could be considerable variation in overall chemical composition among the different formulations of both natural and synthetic OC preparations (Haas et al., 1997). The capsicum is the pepper from which oleoresin capsicum is derived. Capsicums are different in reference to total incapacity, taste, appearance, aroma, pungency, color origin, and growing process. The DNA structure and toxicity levels of capsicums will vary. To explain this better, oleoresin capsicum derived from one pepper, under exactly the same specification and extraction process, will in fact be different from oleoresin capsicum extracted from another variety of capsicum (Logman, 1993). There is a separation of the capsicum plant family from other

plant groups with the quintessence of the chili pepper alkaloid called capsaicin.

Capsaicin is an unusually powerful and pungent crystalline substance found in no other plant and is the source of pungency and heat in capsicums. There are approximately 300 varieties and 20 species of capsicum.

The next important term that will provide a better understanding of pepper spray is capsaicinoid. The single substance, capsaicin, was shown to be a mixture of two unsaturated and three saturated homologs. This mixture is now called capsaicinoids. The pungent components of capsicum annum include at least five compounds known as capsaicinoids (Logman, 1993).

The five compounds that compose capsaicinoids are listed along with their code and systematic name.

<u>Name</u>	<u>Code</u>	<u>Systematic Name</u>
Capsaicin	C	trans-8-methyl-N-vanillyl-6-nonenamide
Dihydrocapsaicin	DHC	8-methyl-N-vanillyl-nonamide
Nordihydrocapsaicin	NDHC	7-methyl-N-vanillyl-octamide
Homodihydrocapsaicin	HDHC	9-methyl-N-vanillyl-decamide
Homocapsaicin	HC	trans-9-methyl-N-vanillyl-7-decenamide

The most abundant and potent analogues in peppers and consequently pepper extracts are capsaicin and dihydrocapsaicin, which contribute most to the capsaicinoid concentration and pungency of the pepper (Reilly & Crouch, 2001). The concentration of capsaicinoids in a pepper ranges from 0.1 to 2.0% (dry weight) and this will be dependent on the particular type of pepper (Reilly & Crouch). Growing conditions of the peppers and time of harvest will have an effect on the capsaicinoid concentration.

The variation of concentration levels of capsaicinoids is dependent on several things. The manufacturers of oleoresin capsicum and self-defense weaponry use few, if any, analytical measures to determine the concentration of active ingredients in the product; therefore they cannot ensure a consistent chemical composition. The primary test for product composition is a taste test to determine the product's ability to elicit pain. This test is known as the Scoville Organoleptic Test (Reilly & Crouch, 2001). The problem with this test is that it is subjective in nature and fails to produce a quantitative assessment of the capsaicinoid concentration; therefore, the potential product toxicity is difficult to predict.

When pepper spray manufacturers make a claim of high raw material of Scoville Heat Units (SHU), they are referring to the level of capsaicin. Raw material SHU alone is not the key measurement of oleoresin capsicum effectiveness. This simply states the level of the capsaicin in the raw OC before it is mixed with a carrier or propellant and placed in an aerosol can. It also does not indicate the level of intensity of the other capsaicinoid compounds, which are responsible for producing the required effects needed for full incapacitation or REMS (Logman, 1993).

REMS : Effected areas of capsaicinoid compounds found in oleoresin capsicum.

Respiratory

Eyes

Motor Control

Skin/Mucous Membranes

Typically, pepper spray weapons contain a 10% solution of oleoresin capsicum diluted in a suitable solvent (Reilly & Crouch, 2001). The FBI conducted a report on oleoresin capsicum and used a brand of pepper spray with 5% OC concentration.

Importantly, the pepper concentration gives the percentage of the oleoresin liquid in relation to other can contents. It does not address the strength of the oleoresin capsicum. For example, 10% of one of the hundreds of pepper species will not necessarily be more potent than 5% of another pepper (Logman, 1993). Further factors to be considered regarding higher concentration are:

1. Higher concentration will not affect the level of incapacity; however, it will lengthen the necessary recovery period, thus affecting decontamination.
2. Higher concentration may clog the aerosol spray.
3. The lethal dosage (LD), lethal concentration (LC), and Threshold Value (TLV) will change drastically with higher concentration; therefore, a complete toxicological report on all the aerosol contents should be furnished to the law enforcement agency prior to purchasing by the manufacturer (Logman).

Researchers conducted a study of the chemical and elemental comparison of organic and inorganic analyses of oleoresin capsicum sprays from two manufacturers. There was considerable variation in overall chemical composition between the two formulations observed. Of the two samples analyzed, the first sample A had components derived from natural products (hot peppers). Sample B's formulation appeared to be synthetic and both contained non-natural carrier solvents, which became the primary ingredient of their respective formulations. Questions were raised from this study in regard to a potential limited shelf life of OC weaponry due to uncontrolled chemical reactions within the canister (Hass et al., 1997). WC with different compositions will potentially be inconsistent in effectiveness, capsaicinoid concentrations, manufacturing formulations, solvent/propellant delivery systems, packaging, and shelf life (Hass et al.).

Because the citizens are using a chemical agent as a protective device, neutralizing agents like pepper spray may be viewed by the public as an acceptable means of force. The strength of pepper spray that is available in most areas of the United States range from .5 % to 10 % which has been known to repel large animals (Hunter, 1994). The public may purchase pepper spray; however, the strength will be approximately 1%. Sales of pepper spray in the 5 % range are restricted to law enforcement. Among state law enforcement agencies, 46 departments authorize the use of oleoresin capsicum spray to be carried on duty by their officers (Reaves & Goldberg, 1999). None of those agencies authorizes the use of tear gas and only three agencies authorize the use of CS. Tactical units were the exception because their missions were very specific, whereas a patrol officer will encounter more face-to-face interactions.

The National Institute of Justice conducted research regarding the benefits of pepper sprays and the limitations of pepper sprays (Oleoresin Capsicum: Pepper Spray as a Force Alternative, 1994).

Benefits of Pepper Spray

1. The effects experienced physically of a combative subject being sprayed with oleoresin capsicum may reduce that resistive behavior.
2. Law enforcement agencies have reported success in the use of oleoresin capsicum on subjects who are extremely excited and agitated, under the influence of drugs and alcohol, and mentally impaired.
3. The aftermath of using oleoresin capsicum seem to leave few if any residual effects, allowing transportation of subject without cross-contamination to the officer. Also decontamination protocol requires only fresh air and soap and water.

4. FBI's Forensic Science Research and Training Center did not find any long-term health risks associated with the use of oleoresin capsicum.
5. Thirty-nine police agencies and three correctional institutions were studied that use oleoresin capsicum. None reported any medical problems encountered by subjects being subdued and arrested, and the officers experienced no medical problems from the use of oleoresin capsicum.
6. Agencies that have implemented oleoresin capsicum claim fewer allegations of police use of excessive force or police brutality, thus lowering civil liability.
7. Agencies using oleoresin capsicum have reported a reduction in officer and arrestee injuries following the introduction of oleoresin capsicum.
8. Manufacturers make available to law enforcement several OC concentrations with differing size spray units and spray patterns for applications ranging from personal use, to crowd control, to tactical units.

Limitations of Pepper Spray

1. The use of oleoresin capsicum sprays with alcohol-based carriers should be avoided when flames or sparks are present, as the carrier is inflammable.
2. When issued oleoresin capsicum spray, officers should carefully review the manufacturer's information including the product's material safety data sheet because OC sprays often contain chemicals that may pose a fire threat of other health and safety hazards.
3. Oleoresin capsicum sprays that incorporate other chemical agents may leave more residual effects, thus requiring different measures to decontaminate.

4. The suspect must be within a certain range of the product for the OC spray to be effective.
5. Subjects who are wearing eyeglasses, sunglasses, and other protective eyewear and clothing may greatly reduce the effectiveness of OC sprays. Also, if the subjects' hands are placed in front of their face, the OC spray may be ineffective.
6. Failure to acquire adequate training on the use of OC spray can lead to improper use, possibly resulting in expensive litigation.
7. Oleoresin capsicum sprays can be used against the officer.
8. Exposure to high temperatures over an extended period of time can cause the aerosol can to leak, rupture, and explode.
9. OC sprays cause upper respiratory inflammation; therefore, they may have detrimental effects on people with preexisting respiratory problems.
10. No chemical agent is 100 % effective, and officers should not get lured into a false sense of security.

There is an extremely wide acceptance of the use of pepper spray within the realm of law enforcement; however, there are some departments that are reluctant to expand the use-of-force continuum. The following situations reflect different scenarios that may have been resolved by the use of oleoresin capsicum.

A county deputy sheriff receives a call and responds to a domestic dispute in a rural area of the county. The deputy passes one of the subjects speeding in the opposite direction, with the closest backup 20 minutes away. The responding deputy pursues the vehicle until it stops and the driver flees on foot. The deputy confronts the subject and a

physical struggle ensues. The subject was not assaultive; however, he escapes when the deputy cannot effectively control him (Hunter, 1994).

Officers of another law enforcement agency take part in a multi-vehicle pursuit as a suspect attempts to avoid apprehension. The suspect eventually stops the vehicle, but will not comply with the officers' verbal commands to lie face down. After attempts of physical restraint fail, the officers used tasers and repeated baton blows. A bystander records on video what appears to be the officers blatant disregard for the citizen's safety (Hunter, 1994).

Officers are assigned to transport a mental patient from a detention facility to the hospital. The subject refuses to sit calmly in the backseat of the patrol vehicle, so the officers hog-tie the subject. Upon arrival at the hospital, following a five-minute drive, the officers find the subject dead in the back seat. The coroner's report lists the cause of death as positional asphyxia (Hunter, 1994).

The above scenarios share commonalities such as the officers acted with departmental policy for the most part. Each scenario points out a missing link in the use-of-force continuum. The use of oleoresin capsicum could have become a solution for all three scenarios and provided the officers with a non-lethal use of force when dealing with subjects who are passive resistive and have not become assaultive.

Tallahassee Study

Most studies surrounding the topic of law enforcement use of force have focused on deadly force. One reason deadly force receives most of the research attention is that the statistics are well recorded and easily accessible. However, deadly force is not the answer for every aggressive situation an officer might encounter. Research conducted on

non-deadly force has addressed two categories: authorized force and excessive force (Morabito & Doerner, 1997).

There are an estimated 41 % of major public safety agencies in the United States that authorize their personnel to use oleoresin capsicum (OC). Most studies conducted on non-lethal force were done before the introduction of oleoresin capsicum, and the use of OC has not been a topic of extensive research. The Tallahassee Study attempts to address police-citizen confrontations that are resolved through the use of OC. The Tallahassee Police Department (TPD) is located in Tallahassee, Florida with a population over 130,000 citizens, and the city encompasses an area of more than 60 square miles. The police department has 320 sworn positions and successfully underwent accreditation in 1986. The Index Offenses for personal and property crimes during the years 1994 and 1995 for Tallahassee were above the state average (Morabito & Doerner, 1997).

Like most law enforcement agencies, TPD requires officers to complete a use of force report whenever the officer uses force to overcome a combative or resistive subject. Policy mandates a written report if an impact weapon or chemical agent has been deployed. A use of force report submitted will automatically open an internal affairs investigation at TPD.

The TPD guidelines mandate that the officers follow a use of force matrix or more commonly referred to as a use of force continuum. The TPD matrix is level 1, officer presence, level 2, verbal directions, level 3, physical control techniques, level 4, impact weapons such as baton, flashlight, or a stun gun, and the use of oleoresin capsicum was placed on the fourth level. When TPD initially approved the use of OC, level 5 and level 6 are strikes used to incapacitate suspects exhibiting behavior that would produce death or serious bodily harm (Morabito & Doerner, 1997). The Tallahassee Police Department

downgraded the use of OC from level 4 to level 3 on June 27, 1994, making the findings of the study before and after the agency downgraded the position of OC in the use of force matrix. With the new position of OC, the minimal threshold for the authorized use of oleoresin capsicum was reduced to verbal resistance.

Prior to June 27, 1994, the Tallahassee Police Department reported 366 violent encounters between suspect and police. Eliminating mixed level responses and missing suspect data, the quantity of level 4 “pure” cases totaled 163, where officers used either impact weapons, OC spray, or both techniques. After June 27, 1994, data collected revealed 563 level 3 observations for the post-downgrade period. The downgrades were displayed in frequency distributions of the variables before and after the agency downgraded oleoresin capsicum’s position in its use of force matrix.

The Tallahassee Police Department found as a result of this study that officers will use OC over a hand-to-hand confrontation when confronted with suspects who are taller and heavier than themselves. Officers are more likely to scuffle with suspects who imply they have a weapon, actually do have a weapon, or initiate physical contact. Also, two important deductions were discovered. College educated officers are more than twice as likely to choose oleoresin capsicum over personal weapons when dealing with heavier suspects. Rookie officers (less than five years experience) who are at a weight disadvantage are over twice as likely to resort to the use of oleoresin capsicum. When the study profiled injuries and their severity, the use of OC resulted in fewer and less serious injuries for both officers and offenders compared to impact weapons and physical contact techniques. The reduction of injuries and severity of injuries supports the relocation of OC spray from level 4 to level 3 and this may also reduce loss of duty time or civil litigation. Major injuries tend to happen when techniques other than OC are

employed, and that is consistent with the experience of the Los Angeles Police Department (Morabito & Doerner, 1997).

The Tallahassee Police Department found the use of oleoresin Capsicum to be a valuable tool for their use of force matrix and with the equalizing effects of non-lethal weapons, some of the traditional hiring barriers pertaining to size and gender may quickly become history.

Baltimore County Study

The move to implement a new level of force into a law enforcement force continuum is never a simple task. The Baltimore County Police Department (BCPD) allowed the International Association of Chiefs of Police to conduct an extensive study for the Institute of Justice on the Introduction of oleoresin capsicum into the Baltimore County Police Department from July 1993 through March 1994 (Edwards et al., 1997). As a result of the study, several key questions were answered regarding pre and post introduction evaluations of assaults on officers, subject injuries and the number of use of force complaints. Implementation/processing issues that involved the product selection, training and operational considerations were also studied (Concepts and Issues Paper, 1995).

The Baltimore County Police Department located in Baltimore Maryland, which has an approximate population of 695,000 citizens and spans an area of 612 square miles. Baltimore County covers urban, suburban, and rural areas. The BCPD has 1,500 sworn officers, 80% of whom are assigned to the Field Operations Bureau. Baltimore County officers responded to 442,436 police calls in 1993 where police service was provided through nine patrol bureau precincts.

The study was designed to evaluate two major components: how oleoresin capsicum was adopted and implemented by BCPD, and how OC impacted police injuries, subject injuries, and brutality/use of force complaints and its effectiveness in subduing uncooperative or physically resistant subjects (Concepts and Issues Paper, 1995). The committee selected to seek information regarding the study developed five principle research questions pertaining to the impact of OC spray in confrontations between police officers and citizens:

1. Would assaults on officers be reduced in arrest and other confrontational encounters?
2. Would injuries to police officers be reduced in arrest and other confrontational encounters?
3. Would injuries to suspects be reduced in arrest and other confrontational encounters?
4. Would use-of-force complaints on police officers be reduced in arrest and other confrontational encounters?
5. How effective is OC in human and animal encounters?

In order to gather information and ultimately answer the above questions, there would have to be a method of obtaining data. A form was designed and would be the initial collection instrument and would be completed by each officer who used OC. A follow-up interview would validate all information collected by the data form. The on-site observer with each officer would conduct the follow-up interview that would address the same issues as the data collection form, however, allowing the officers to add any comments, suggestions, or observations.

The study addressed the five principle research questions from the collection of data and made the following findings: Question number one asked if pepper spray would reduce the number of assaults on officers during arrest and confrontational encounters. Three years prior to the implementation of oleoresin capsicum the assaults on officers were decreasing, and the number of officers assaulted declined substantially after OC was an authorized means of force. Question number two asked if the use of OC would reduce injuries to police officers in arrest and other confrontational encounters. During the study, OC was employed 194 times and only 21 officers (11 %) reported receiving any injuries. However, a pre-post test analysis was not available, the post-OC period suggests that the use of OC has the ability to lessen officer injuries. Question number three asked if the use of OC would reduce injuries to suspects in arrest and other confrontational encounters. Again, a pre-OC and post-OC comparison was not available; however, very few suspect injuries occurred during the post-OC project. Of 174 incidents involving oleoresin capsicum, there were 14 suspects (8 %) who received any injuries. Question number four asked if the use of OC spray would reduce the use of force complaints on police officers in arrest and other confrontational encounters.

The data suggest that although there was an increase in calls for service and fewer patrol officers working their beats, use of force complaints substantially declined. The number of complaints decreased 53 % between the first pre-OC period and the post-OC period. A 40 % reduction occurred between the second pre-OC and post-OC periods. There were no policy changes regarding use of force or other contributing factors; therefore, it is likely that pepper spray did account for the decline in complaints.

Question number five asked about the effectiveness of OC in human and animal confrontational encounters. OC proved to be extremely effective for the BCPD with an

overall effectiveness of 90 % on human confrontational encounters. Oleoresin capsicum was administered to animals on 20 occasions and reported 100 % effective at deterring an attacking animal. With the inclusion of animal sprays, OC was found to have a 91 % level of effectiveness.

During the nine-month period that OC spray was used by the BCPD, the spray was used 194 times (human and animals). Incidents and arrests that required the use of oleoresin capsicum were mostly battery, assault, disorderly conduct, domestic violence, and traffic-related. Most of the above incidents occurred outdoors (62 %) with the remaining taking place either indoors or in vehicles. Of the humans sprayed, most were males (84 %) of either medium or large frame size.

Oleoresin Capsicum Policy and Procedures

Law enforcement agencies operate under strict guidelines called policy and procedures. Approximately 91% of local police agencies that employ 99 % of all officers use a written policy on the use of deadly force. Eighty-four percent, employing 96 % of all officers had a policy on the use of non-lethal force (Edwards et al., 1997). With a push for law enforcement agencies to become nationally accredited, police agencies must adopt and maintain written policy and procedures.

The force continuum regulates the amount of force used for what level of resistance the officer encounters. The operating procedures usually mandate that OC is appropriate for use with actively hostile individuals who have resisted verbal commands, when physical control techniques are warranted, or when an officer may possibly be injured (Onnen, 1993). The policies and procedures of a law enforcement agency will also dictate the type of training that an officer receives on the use of pepper spray (Nowicki, 2001).

Legal issues are yet another reason for departmental procedures. The officers follow uniform policies and procedures and all receive the same training on the use of pepper spray, therefore, eliminating inconsistencies as to when pepper spray should be used, how it is deployed, and, lastly, what type of combative subject it should be directed toward.

Most law enforcement agencies will maintain a separate policy regarding the use of pepper spray. The policy will state the purpose of using oleoresin capsicum and the policy that best suits the agencies need for pepper spray will be implemented. The purpose of the policy is to establish guidelines for the use of oleoresin capsicum. A typical policy will state the following varying somewhat according to the department needs:

- A. No employee shall be permitted to carry and /or use chemical agents until first completing the department approved training course.
- B. Only the chemical agent of the type and style approved by the Chief of Police shall be used by department employees.
- C. A force report shall be completed by every employee in any instance that chemical agents are used. In the event of an accidental discharge, a written report of the circumstances shall be completed and an investigation of the incident shall be conducted by the employee's immediate supervisor.
- D. Use of chemical agents shall require proper justification. "Horseplay" in the use of chemical agents shall result in disciplinary action.
- E. Generally, chemical agents should be used after soft techniques such as the come-along have failed and prior to use of striking techniques will impact weapons. Generally, the use of chemical agents should be on individuals who

are actively, aggressively, and/or violently resisting arrest. Resisting arrest charges should also be placed on the individual.

- F. If an employee has articulable facts and / or prior knowledge of a subject's recent violent tendencies, then use of chemical agents should be considered prior to any hands-on technique.
- G. If the use of a chemical agent fails to control an individual, the employee should disengage and escalate to impact weapons use and / or summon additional help.
- H. If opportunity and time permits, use of a chemical agent should wait until arrival of back-up officers to assist and to provide an additional witness.
- I. Do not use chemical agents on a subject in possession of or with access to a firearm.
- J. Do not spray an attack dog at over 3-4 feet. Dogs have quicker reaction than humans and will duck to avoid the spray (Use of Force, Knoxville Police Department, 2002). Police officers using pepper spray should be knowledgeable of the effects of the pepper spray and to be alert for possible medical needs after using pepper spray (Morgan, 1999).

Use of Oleoresin Capsicum on Various Subjects

When law enforcement agencies approve a use of force tool or technique to be implemented into the force continuum, a large concern is whether or not it will be effective with the majority of resistive subjects. Police officers frequently find that when dispatched to a situation where a person is combative, they usually find that drugs, alcohol or mental illness may be a contributing factor to the problem. There have been

concerns as to the effectiveness of oleoresin capsicum on subjects under the influence of alcohol or drugs, or who suffer from mental illness.

A study was conducted regarding police encounters with resistive subjects and the use of pepper spray during those encounters (Kaminski, Edwards, & Johnson, 1999). Findings suggest that oleoresin capsicum is generally effective; however, police officers report a lower success rate with pepper spray during encounters with subjects under the influence of drugs or alcohol or who suffer from mentally illness. Of the subjects observed, those who were under the influence of alcohol had a tendency to be more affected by the pepper spray, while the results for those subjects afflicted with mental illnesses were mixed. The officers' deployment of the pepper spray may play an important roll in the effectiveness, especially if the subject did not receive a complete burst of pepper spray to the facial area (Kaminski et al.).

The capsaicin and other capsaicinoids affect certain nerve fibers (C-fibers); most commonly the sensory type (Busker & Van Helden, 1998). The dosage will dictate a lot of the affects. At a low dose, the usual irritation, mucus formation, sneezing, and simulation of coughing reflex occur. There is a much bigger question that lingers within the law enforcement community and that is the effect of oleoresin capsicum in correlation to positional restraint. Much concern has been voiced about restraint methods where subjects are hog-tied or hobbled, lying in a prone position with ankles and wrists bound behind their back and secured together (Chan, Vilke, Neuman, & Clawson, 1997). This method of restraint has been thought to lead to positional asphyxia, which is simply death caused by obstructed airways or other interference with breathing resulting from body position (Chan et al., 2001). Because normal breathing is interrupted by the use of pepper spray, the concern of law enforcement is validated when a subject is hot-

tied or hobbled after being sprayed with OC. Officers should place a sprayed subject in a seated, upright position (Chan et al.).

A group of medical researchers at the University of California at San Diego conducted a study on whether OC exposure by itself or in conjunction with positional restraint resulted in respiratory compromise that could put individuals at risk for serious injury or death. The study also examined whether the use of OC spray/positional restraint affected blood pressure and explored whether the health effects associated with OC exposure might be influenced by: body weight, size, asthma or other pulmonary disease, use of respiratory inhaler medication, or a history of smoking (Chan et al., 2001).

The testing groups were 37 individuals consisting of the training staff and cadets from the San Diego Regional Public Training Institute. Once the preliminary testing was concluded, 34 subjects completed the study. The median age was 31.7 years, with subjects ranging from 22 to 46 years. The median weight was 174 pounds, ranging from 115 to 236 pounds. Seven subjects were classified as overweight with a body mass index (BMI) of more than 28 kg. Eight subjects had a history of smoking, lung disease, or respiratory inhaler medication use.

The study focused on the effects of oleoresin capsicum and a placebo spray followed by sitting in restraint positions. After excluding some trials due to inadequate inhalation of OC, there were 128 separate trials analyzed by this study.

After tests were conducted for the sitting position, researchers found no evidence that oleoresin capsicum inhalation and exposure resulted in any respiratory compromise in the sitting position and OC spray exposure did not result in any statistically significant differences in blood oxygenation when compared with placebo in the sitting position. There was a small, but significant, finding that suggests ventilation actually increased

after OC exposure. The restraint position contributed to the reduction of forced vital capacity (FVC), which is defined as the amount of air that can be expelled from the lungs after a maximal inspiration). Also found was a decline in the FEV (the amount of air that a subject can forcibly expel in 1 second during a forced expiration test). No evidence was found of hypoxemia (low levels of blood oxygenation), hypercapnia (increased carbon dioxide levels), or hypoventilation (decreased ventilation of the lungs). Consequently, researchers found no proof that OC exposure resulted in any additional change in respiratory function in the restraint position. Pulmonary function was restricted in both the OC and placebo groups; however, measurements remained within the normal range. The above findings are very important to law enforcement officers in the field who are faced with administering OC spray and then restraining the subject to transport to a lock up or holding facility. The average heart rates for all groups (regardless of exposure or position) remained well within normal limits (Chan et al., 2001).

Researchers found no evidence of additional restrictive pulmonary dysfunction in seven overweight subjects in the sitting or even the restraint position with OC or placebo exposure. In this trial, oleoresin capsicum exposure did not lead to hypoxemia or hypoventilation in either the sitting or restraint position. However, consideration must be given to the small size of the test group and that no subjects were grossly overweight. As for the asthma, smoking, and respiratory inhaler medication users, researchers found no evidence that OC spray inhalation and exposure resulted in respiratory compromise in subjects with a history of lung disease, asthma, smoking, or respiratory inhaler medication use.

The San Diego study answered the questions that law enforcement officers and administrators have about the safety of oleoresin capsicum in reference to restraint positions. However, the study could not replicate field conditions, therefore limiting the research and somewhat challenging the findings.

Law Enforcement Training and Qualification with OC

Training police officers in the use, understanding, deployment, and decontamination of oleoresin capsicum could be the most important step taken by law enforcement agencies with the consideration of implementing OC into the departmental force continuum. As with most law enforcement tactics and techniques, there are several training packages available, with most concentrating on background information pertaining to OC, an introduction, use of the delivery system, and familiarity with the effects of OC (Morgan, 1999). Many police departments will depend on an outside agency for its trainers who, in turn, will present a block of instruction for officers in the department. The FBI training regiment for the use of OC consist of approximately four to six hours, and those who are aspiring to be OC trainers can be trained in two days (Weaver & Jett, 1989).

Training in the area of oleoresin capsicum should be documented, and officers receiving the training should undergo testing to prove proficiency with OC spray (Nowicki, 2001). A written examination will measure an officer's comprehension level as to where OC falls within the departmental use of force continuum and information relevant to the properties and effects of oleoresin capsicum. Training should include instruction specifying oleoresin capsicum to be used to restrain and control a combative, non-compliant person. Once the subject has been rendered incapacitated and is compliant, the use of OC is no longer necessary (Concepts and Issues Paper, 1995).

A concept widely used in training police officers in the use of OC is actually spraying the officer during the course. One reason given for this training measure is to examine the reaction an officer will have when exposed to oleoresin capsicum. The officer may panic or have a severe reaction (Nowicki, 2001). It is much safer for a police officer to experience OC spray in a controlled training session, rather than on the street, during a struggle with a combative subject.

An Arizona State Trooper gave an account of his exposure to OC spray used against him, and the officer said he survived the attack because training had taught him how to react (Oleoresin Capsicum: Pepper Spray as a Force Alternative, 1994). When qualifying new agents at the FBI Academy, the Firearms Training Unit (FTU) at Quantico, Virginia requires each new agent to be sprayed with a 1 to 3 second burst of oleoresin capsicum. Once an agent in training has been sprayed, an aggressor will attack the trainee. The training agent must then maintain the security of a sidearm during the attack. The training agent is required to then open their own eyes, draw the sidearm and give verbal commands until the aggressor assumes a prone position on the ground. Training such as this will teach officers to fight through OC exposure and not surrender to the effects of oleoresin capsicum spray. In addition to instilling confidence in police officers, being sprayed in training will add weight to courtroom testimony. Courts may be more willing to side with law enforcement officers who have been sprayed and have experienced first hand the effects of OC (Hunter, 1994). This is one reason why documentation of training is so vital and why many agencies are actually videotaping training session on the use of force.

Training objectives for the use of oleoresin capsicum will include but not be limited to the following areas of study:

1. Where OC falls within the use of force continuum.
2. The chemical characteristics, make-up, and effectiveness of OC.
3. Physiological and psychological effects of OC spray on subjects.
4. The use of proper stance, grip, and spraying technique used when deploying OC.
5. Officers use of good, clear verbal commands prior, during, and after the deployment of OC.
6. Knowledge of decontamination procedures for individuals sprayed and surrounding areas to include patrol vehicle.
7. First-aid procedures for exposed individuals.
8. Officer safety and officer exposure procedures.
9. Reporting abilities for use of OC on subjects / animals (Pepper Spray Evaluation Project: Results of the Introduction of Oleoresin Capsicum (OC) into the Baltimore County, MD, Police Department, 1995).

Training is essential for the use of oleoresin capsicum and with training OC may be implemented into the law enforcement force continuum and become a vital asset in effecting the arrests of combative, resistive subjects. However, prior to any law enforcement officer carrying OC on duty, a qualification examination should be administered. Officers who have received training on the use of OC should have the capabilities to achieve a passing score on a written examination regarding various aspects of OC. The exam should be modeled to test the officers' knowledge. The exam should consist of but not be limited to the following topics:

1. Maximum amount of OC that can safely be used on combative subject.
2. Length of a single burst of OC.

3. Shelf life of OC.
4. The particular area of the body OC should be directed to when applying.
5. The pattern shape of OC that the canister disperses.
6. Recommended ventilation time.
7. Medical assistance protocol.
8. Maximum effective range of OC.
9. Position of OC on departmental use of force continuum.
10. Recommended hand for holding canister during application.
11. Procedures for and after a resistive subject has been brought under control by OC (Use of Force, 2002).

Most law enforcement agencies have implemented into the OC training regiment a policy that officers must be sprayed with OC before they are certified to carry it in the field. It is unbendingly agreed upon by law enforcement OC trainers of the National Criminal Justice Training Council (NCJTC) that it is necessary for police officers to be sprayed in training sessions prior to receiving a certification that will enable them to carry pepper spray (Kelley, 2000). It is also vital that every spray an officer receives or deliveries either in training or in the field be documented for testimonial purposes, thus exhibiting the officer's experience with pepper spray (Kelley).

Medical Implications of Oleoresin Capsicum

Before law enforcement agencies will endorse a product or technique new to the force continuum, the product will endure much research and testing. A use of force instrument or technique designed purposely to inflict a certain amount of pain to gain compliance from a combative, resistive subject will come under much scrutiny. Officers

frequently apply a pain compliance tactic, and there are always risks of injuries to all parties involved.

The use of oleoresin capsicum by law enforcement officers has given rise to much research about the medical complications involved. When OC is sprayed onto a person, within seconds the person will experience involuntary closure of the eyes, shortness of breath, and loss of body motor control (Busker & Van Helden, 1998). When the pepper spray is inhaled, the respiratory tract becomes inflamed and breathing is restricted (Granfield, Onnen, & Petty, 1994). As a result, the combative person exposed to pepper spray immediately ceases the aggressive behavior, and in most cases the combative person can easily be taken into custody (Busker & Van Helden).

Some oleoresin capsicum manufacturers state that spraying OC directly at a subject's eyes will not cause permanent eye damage. Some manufacturers maintain that the use of OC will not cause respiratory system damage nor skin depitmentation (Logman, 1993). These same manufacturers also state that their product in over 10 years of field experience has not induced an adverse reaction such as respiratory illnesses, heart problems, or poor reflexes (Logman).

Some extensive medical research referencing the use of oleoresin capsicum was conducted by the Firearms Training Unit (FTU) of the FBI Academy, Quantico, Virginia. The FTU contacted two research chemists assigned to the FBI Forensic Science Research and Training Center and an Analytical Chemist. These chemists concluded that because OC is used in foodstuffs and pharmaceutical products and is derived from a naturally occurring plant, cayenne pepper, its usage would be outside of many governmental regulatory guidelines that regulate man-made synthetic chemical agents such as CN or CS (Chemical Agent Research Oleoresin Capsicum, n.d.). The chemists also found that

they could foresee no long-term health risks associated with using oleoresin capsicum as a chemical agent.

Initially, the research conducted by the FTU was to examine OC as a supplement of Chloroacetaphenone (CN) and Orthocholorbenzalmalononitrile (CS) (Chemical Agent Research, Oleoresin Capsicum, n.d.). The U.S. Army Chemical Research and development Center (CRDEC) in Maryland was contacted and provided documents regarding experimentation with capsicum on laboratory animals. However, the CRDEC was unable to provide information as to short or long term mutagenic or carcinogenic medical research on exposure to oleoresin capsicum (Chemical Agent Research Oleoresin Capsicum).

A study regarding the mutagenic and carcinogenic effects of capsaicin and capsicum was conducted and it was concluded that capsaicin and capsicum gave positive responses in the Ames test, which tests for mutagenic effects. The mutagenic activity of these compounds is manifested only in some bacterial strains (Busker & Van Helden, 1998). Laboratory mice and rats were observed after being feed and injected with capsicum. After the animals were injected, it was concluded that capsicin had no effect on the general health of the animals. The injections did not effect the animals body weight or growth rate. The researchers did not observe an increased rate of malignant tumors during the study (Busker & Van Helden).

Between July 1987 and May 1989, 59 individuals were sprayed directly in the face with Individual Protective Devices (IPDS) containing solutions ranging from one to five percent of OC. The physical effects were more severe when they were exposed to a larger percentage of OC and when they were sprayed with a continuous three-second

burst or three one-second bursts as opposed to a single one-second or two-second burst (Chemical Agent Research Oleoresin Capsicum, n.d.).

The 59 individuals were observed exhibiting symptoms such as: twitching of the eyes to involuntary closing of the eyes; respiratory inflammation ranged from coughing and shortness of breath to gasping for breath with a gagging sensation in the throat. Exposed skin inflammation ranged from a burning sensation to an acute burning sensation and redness of the skin (Chemical Agent Research Oleoresin Capsicum, n.d.). Respiratory functions returned to normal within two minutes after each test. The vision acuity returned within two to five minutes after decontamination. The eyes appeared bloodshot for 10 to 15 minutes, but no one experienced extended visual problems. Medical attention was readily available throughout the testing, but nobody required any further medical attention other than personal decontamination (Chemical Agent Research Oleoresin Capsicum).

Incapacitating Abilities of OC

The ultimate goal of deploying pepper spray during a confrontation is to incapacitate the combative subject resisting arrest so that restraining devices can be safely applied. How is the effectiveness of pepper spray measured? There are few field studies that accurately measure the levels of effectiveness and incapacitating abilities of oleoresin capsicum. Pepper spray has been evaluated in Portland, Oregon in 1985, New Britain, Connecticut in 1993, and British Columbia in 1992 (Smith & Alpert, 2000). The variables used for testing and the methods are unknown; however, effectiveness ranged from 85 % in the Portland study to 95 % in the Connecticut study (Smith & Alpert).

The Los Angeles Police Department conducted a study regarding the effectiveness of eight use of force tactics in 502 violent, police-citizen encounters that

occurred in 1991 (Smith & Alpert, 2000). Effectiveness was defined as whether the level of force used ended the altercation. The levels of force and the effectiveness are as follows:

<u>Level of Force</u>	<u>Effectiveness</u>
1. Baton	85%
2. Karate kick	87%
3. Punch	75%
4. Miscellaneous body force (Pushing, shoving, grabbing)	94%
5. Flashlight strikes	96%
6. Swarm tactic	92%
7. Chemical agent (CN, CS, or OC)	90%
8. TASER	86%

The study and the effectiveness are explained further in the fact that major or moderate injury rates for suspects ranged from a high of 80 % when a flashlight was used to zero when a chemical agent or the TASER was used. Major or moderate injury rates for officers ranged from a high of 36 % when officers punched suspects to zero for the use of chemical agents or tasers (Smith & Alpert, 2000). The effectiveness of some levels of force, such as the flashlight strikes and baton were higher than that of a chemical agent. The injury rates for both the suspects and officers when striking tactics were deployed should be a concern for law enforcement officers and administrators. According to this study, law enforcement agencies are at a much greater risk of civil lawsuits when officers deploy striking instruments. The use of oleoresin capsicum

appears to be a much safer controlling tactic; therefore, the officer and the department are at a lower risk of complaints and lawsuits.

Reducing Risk of Injury by Using OC

Law enforcement agencies share a common goal when making arrests and apprehending suspects and that is to achieve the objective with the least amount of injury to the officer and suspect. The study conducted on oleoresin capsicum use by the Baltimore County, Maryland Police Department (BCPD) by the International Association of Chiefs of Police during 1993-94 suggest a reduction in incidence of assaults on officers following the adoption of oleoresin capsicum (Kaminski et al., 1999).

The collection of data showed that officer and suspect injuries were minimal when pepper spray was used in confrontational encounters. Of 194 pepper spray incidents, only 21 officers (11 %) and 14 suspects (7 %) received any injuries (Pepper Spray Evaluation Project: Results of the Introduction of Oleoresin Capsicum (OC into the Baltimore County, MD, Police Department, 1995).

Citizen complaints alleging excessive use of force are directly related to injuries sustained during an altercation. According to the BCPD study, which evaluated pre and post-OC spray reports for three separate nine-month periods in 1992, 1993 and 1994, as officer use and experience with pepper spray progressed, the number of complaints quickly decreased. Overall, citizen complaints after the implementation of OC spray dropped substantially, totaling 51 for the OC period versus 109 for the first pre-OC period and 85 for the second pre-OC period (Pepper Spray Evaluation Project: Results of the Introduction of Oleoresin Capsicum (OC) into the Baltimore County, MD, Police Department, 1995). The Baltimore County Police Department did not initiate any major policy changes regarding use of force during pre- and post-data collection it is likely that

the use of pepper spray accounted for the decrease in complaints (Edwards et al., 1997). The internal affairs officers of the BCPD noted that unlike impact weapons, the effects of OC are short-lived and non-traumatic; pepper spray thus reduces the likelihood that brutality or excessive force complaints would be reported (Edwards et al.). To date, BCPD has not had any complaints or suits filed that relate to the issue of OC spray (Pepper Spray Evaluation Project: Results of the Introduction of Oleoresin Capsicum (OC) into the Baltimore County, MD, Police Department).

The lower risk of injury during the use of oleoresin capsicum was not isolated to the Baltimore County study. The effectiveness studies of pepper spray examining the Portland, Oregon and New Britain, Connecticut Police agencies also revealed lower numbers regarding injuries and complaints (Smith & Alpert, 2000). In a two-year period prior to the implementation of pepper spray by the Portland police, 69 % of suspects and 31 % of officers involved in use of force incidents were injured. After pepper spray became available, only 12 % of officers and suspects were injured during police-citizen use of force encounters (Smith & Alpert). An even more impressive statistical report was the Connecticut study, where no officers or suspects were injured in 360 use of pepper spray (Smith & Alpert). Implementation of pepper spray into a small department in North Carolina reduced the number of instances where officers responded to suspect resistance (hands and feet) with physical force by 25 % (Smith & Alpert).

In 1992, the Institute for Law and Justice (ILJ) surveyed US law enforcement agencies regarding their use and experiences with a variety of less-than-lethal weapons. Three hundred seventy-eight police and sheriffs' departments responded to the survey that asked about the effectiveness of the weapons they authorized. Telescoping batons and OC spray were the most commonly used police weapons at subduing resistive

suspects. Overall, OC spray was judged to be the safest and most effective of all of the weapons listed on the survey (Smith & Alpert, 2000).

Methods of Deploying Oleoresin Capsicum

Because so many law enforcement officers are now authorized to carry oleoresin capsicum on their person and use it as part of the force continuum, personal issue OC canisters are issued (Kaminski et al., 1999). The canisters are small, lightweight, and easy to carry in either snap or velcro-fastened holsters attached to the officers' belts, making the spray available for the officer to deploy when confronted by a resistive suspect.

Officers should carry an OC canister that contains between two and four ounces of OC and to assure that the spray contained in the canister is only OC and not a combination of OC and a true chemical agent like CS. The use of oleoresin capsicum is placed lower on the use of force continuum, whereas agents such as CS are usually placed higher on the continuum.

Law enforcement agencies will be taxed with deciding what spray pattern the canister they chose to authorize will deliver. There are five basic patterns that exist: cone shaped, the fogger, the stream, the splatter stream, and the foam. There are advantages and disadvantages to each pattern. The cone and fogger systems function best on the respiratory system. Officers need to be aware of what works on the suspects will also work on them. The foam reduces secondary exposure to OC spray, while it is subject to wind resistance and does not function well when spraying into a head wind or a cross wind. The stream and splatter stream works well in a windy situation but does not cause many respiratory effects. Some police officers will carry two canisters of OC with different spray patterns. Carrying two canisters of OC would undoubtedly have to be

approved by the training department of that particular agency and would require more training of the officer electing to take these measures. Another important consideration is the type of spray pattern.

The higher heat and higher percent of OC simply extends the recovery time. For optimum results, the police officer should position himself at least 2 to 10 feet away from the subject being sprayed, while the safest and most effective range is 4 to 6 feet. At greater distances, the spray may be less effective; at closer range, effectiveness may also be compromised (Concepts and Issues Paper, 1995). OC spray should not be discharged directly into the eyes of a subject at a distance less than two feet. With a distance greater than two feet, the officer should spray a single burst lasting between one and three seconds directed at the subject's eyes, nose, and mouth.

Police officers are taught early in their law enforcement career to continuously practice drawing their firearm from the holster and placing it back in the holster using only one hand and without looking away from a potential threat. The same training and practice should be adhered to with respect to holstering and unholstering pepper spray.

The decision as to what side of the duty belt to carry the pepper spray on has been debated for as long as officers have carried pepper spray. There are of course two choices, the strong side (the right side for a right-handed person, left side for a left-handed person) and be drawn from the holster with the strong hands (Oleoresin Capsicum: Pepper Spray as a Force Alternative, 1994). Supporters of this approach believe the strong hand is best used during times of stress, particularly when the task requires dexterity and fine motor movement. Others support the weak side deployment, advocating that the strong hand should be kept free to engage in empty-hand defensive drills and control. It also allows the strong hand to remain free to draw the firearm

(Oleoresin Capsicum: Pepper Spray as a Force Alternative). Training in the use of pepper spray concurs with the fact that drawing the canister with the weak hand and the firearm with the strong hand simultaneously is not wise. Under high stress, the brain's message intended for one hand can go to both hands and result in an unintentionally discharged firearm, perhaps wounding or killing the subject or another officer. The training department of law enforcement agencies that authorize officers to carry OC spray should address the issue of either weak or strong hand deployment of OC, keeping in mind the previous statement regarding stressful situations and officer's reactions.

Methods of Decontamination

Like many techniques used in a law enforcement force continuum, pepper spray requires follow-up and aftercare for the subject that has been sprayed. Because the use of pepper spray is not life threatening, officers generally do not have the burden of seeking medical attention or getting a doctor's release prior to the booking process.

The aerosols that contain OC are not persistent; therefore, personal and area decontamination are relatively simple. Providing fresh air is the first line of decontamination for a subject that has been sprayed with OC (Chemical Agent Research, Oleoresin Capsicum, n.d.). The subject should remain upright and breathe deeply, clearing out the effects of OC (Weaver & Jett, 1989). Within 5 to 10 minutes, the severe potency of OC should diminish, allowing the suspect to be properly handcuffed (Morgan, 1999). The above methods of decontamination are used in the field by the arresting officers; however, it is the responsibility of the officer to ensure that the subject is breathing well and that medical attention is available if the subject request such. Officers should be alert to the subject's actions regarding breathing difficulties, gagging, profuse sweating, loss of consciousness, or other signs of severe distress. Immediate medical

attention should be requested by the officer if any of the above symptoms are exhibited by the subject (Friend, 1995).

Once the subject has been transported to the final destination, the officer should then make available free-flowing cool water, allowing the sprayed subject the opportunity to flush the eyes with water. Normal eye functions, with the use of water, will return in about 10 to 15 minutes (Weaver & Jett, 1989). Mild soap may also be used with the water to help remove the OC from the skin. Strong soaps and vigorous rubbing should be avoided (Friend, 1995).

Officers must also be sure to advise those subjects with contact lenses that have been sprayed to remove them and reassure them that no harm will come to the contact lenses or their eyes (Pepper Spray Evaluation Project: Results of the Introduction of Oleoresin Capsicum (OC) into the Baltimore County, MD, Police Department, 1995). The sprayed subject must be monitored continuously and at no time should be left alone (Friend, 1995). The clothing that the sprayed subject was wearing may also be contaminated and could cause the subject to have difficulty in breathing; therefore, a change of clothing should be available (Weaver & Jett, 1989).

Officers are also responsible for informing the authorities receiving custody of a subject sprayed with OC. This procedure will minimize the risk of injury due to late-developing symptoms and also reduce the risk of civil liability should injury later be claimed. Upon release from any holding facility, the individual sprayed with OC should be made aware that when coming into contact with water could slightly reactivate the pepper spray; however, the effects would only be slight and should dissipate rapidly (Friend, 1995).

Cross-contamination is when oleoresin capsicum spray is physically transferred to a person who has had no previous contact with OC. Officers should use caution when entering a sprayed area until the spray has dissipated (Friend, 1995). The same procedures for decontaminating the subject should be followed by the officer if the officer sprayed or become contaminated by handling or searching the sprayed subject.

Law enforcement agencies that authorize the use of pepper spray will likely teach decontaminating techniques to their officers. Qualification examination should contain questions regarding decontaminating themselves as well as subjects. And finally, the officers should be trained to observe the sprayed subject for any signs of prolonged discomfort.

Legal Issues Relating to Pepper Spray

In 1989, the United States Supreme Court rendered a decision on the court case of *Graham v. Connor* and set forth the constitutional limitations on the use of force by police. The plaintiff in *Graham* was a diabetic who was injured during a violent encounter with Charlotte, North Carolina police officers. He sued the police department and the officers involved alleging that his due process rights under the Fourteenth Amendment had been violated. The Supreme Court held that all claims of excessive force by the police must be judged under reasonableness standard under the Fourth Amendment. The Court declared that police officers may use no more force than an objectively “reasonable officer” would have used under the circumstances. The Court also held that the reasonableness of an officer’s use of force depends upon the severity of the crime at issue, whether the suspect poses an immediate threat to the safety of the officers or others, and whether the suspect is actively resisting arrest or attempting to flee

(Graham v. Connor 490 U.S. 386, 1989). Thus, ultimately stating that officers were justified in the application of deadly force if a chemical agent is used against them (Graham v. Connor).

Pepper spray appears to be the most logical solution to problems of excessive force because it effectively controls combative suspects while inflicting no lasting injuries (Smith & Alpert, 2000).

The legal question that has surfaced in the law enforcement circles regarding use of force is whether or not police officers should be allowed to use deadly force when attacked with OC spray. The increased availability of OC spray devices to the public has greatly increased the chance that such devices may be used against an officer in a confrontation (Oleoresin Capsicum: Pepper Spray as a Force Alternative, 1994).

The issue at question is that law enforcement agencies justify the use of OC spray on the premise that it does not cause serious injury to the person sprayed and, therefore, should be placed on the low end of the use of force continuum (Concepts and Issues Paper, 1995). The effects of pepper spray are not long lasting or the injuries serious, but it almost invariably does involve immediate and complete incapacitation of the target individual. Some attackers may, after spraying a police officer, leave the scene and choose not to harm the officer, but this cannot be counted upon. The Legal Officers Section of the International Chiefs of Police has stated that when a criminal attacks an officer with OC spray, it is with the intent to harm the officer, escape, or both. It is common knowledge that a high percentage of officers who are incapacitated or have had their guns taken away from them are later shot with their own weapons (Concepts and Issues Paper). An attack upon a police officer with OC spray will, in many instances, represent an immediate and deadly threat to the officer's life.

Based on the U.S. Supreme Court findings regarding *Graham v. Connor*, the IACP's Legal Officers Section found that in determining whether an officer's use of deadly force was reasonable, the following factors may be considered: (Pepper Spray Evaluation Project: Results of the Introduction of Oleoresin Capsicum (OC) into the Baltimore County, MD,. Police Department, 1995).

1. The nature of the crime committed by the person or persons confronting the officer.
2. The nature of the verbal or physical threats on the part of the person confronting the officer.
3. The relative strength and fighting skills of the officer and his opponent.
4. The number of officers versus the number of potential assailants.
5. The nature of weapons in the possession of or available to the assailant.
6. The ability to avoid the potential effect of the OC spray.
7. The alternative means of defending against the use or effect of the OC spray.
8. The availability of assistance from others, especially nearby officers.

Police officers have much to process when dealing with a combative subject. In *Graham v. Connor*, the Court held that in judging the reasonableness of an officer's use of deadly force, the fact finder must allow the officer broad latitude and judge the officer's actions from the perspective of the particular officer's perceived threat and the necessity to "make a split-second judgment in circumstances that may have been tense, uncertain, and rapidly evolving (*Graham v. Connor*, 1989).

The FBI Firearms Training Unit (FTU) at the FBI Academy monitors lawsuits that have been filed against law enforcement officers or agencies resulting from the use

of chemical agents. The FTU is presently unaware of any lawsuits resulting from the use of OC (Chemical Agent Research, Oleoresin Capsicum, n.d.).

Pepper Spray Related Deaths

The most noted study to date on the topic of in-custody deaths relating to the use of oleoresin capsicum was conducted by Granfield, Onnen, and Petty (1994). The National Institute of Justice (NIJ) asked the International Association of Chiefs of Police (IACP) to study and collect data on in-custody death incidents where pepper spray had been used in the arrest procedure. They were also asked to evaluate the data to find whether OC could have been a factor in the deaths (Pepper Spray Evaluation Project: Results of the Introduction of Oleoresin Capsicum (OC) into the Baltimore County, MD, Police Department, 1995).

State, local, or federal law enforcement agencies do not categorically report sudden death while in police custody. Therefore, the data on the incidents where death followed the use of OC spray were collected from the following four sources: news media services, California POST, the American Civil Liberties Union of Southern California and IACP members (Granfield et al., 1994).

The study was conducted between August of 1990 and December of 1993, with most of the incidents taking place in 1993, and can likely be attributed to substantial growth in OC spray use as it gains popularity. Thirty incidents were found to have happened during this time period and information was gathered to review the cause of death and to determine commonalities among the cases. However, sufficient information was obtained for 22 of the 30 cases to allow for a thorough review (Granfield et al., 1994). The investigation of the cases included the following procedure:

1. A review of the incident reports of the law enforcement agency involved.

2. A review of the medical-legal investigative officer (coroner or medical examiner) records, including investigation reports and autopsy reports, together with toxicological information and conclusions as to the cause of death.
3. A comparison of all cases where complete details existed to determine what patterns was present in the nature of the confrontations.

Gathering the above information was a solid foundation to begin the study; however, Granfield and his team of researchers sought out more information on all 30 cases. The additional information obtained for each case included: age, gender, race, behavior during arrest, whether a struggle ensued, effectiveness of OC, restraint techniques, drug/alcohol involved and whether the individual possessed a significant disease (Granfield et al., 1994).

All 30 cases involved male decedents and all subjects behaved in a resistive and/or bizarre manner and struggled with the police. In most cases, the OC was ineffective and restraint techniques were used subsequent to spraying. With one exception, all deaths occurred either immediately or soon after the confrontation (Granfield et al., 1994).

Considering the autopsy and police reports reviewed to establish that all causal and/or contributory factors to the death were examined, the results of the review indicate that OC was not the cause of death in any of the cases and that something else caused the subject to die (Granfield et al., 1994). It was also concluded that in 18 of 22 cases, positional asphyxia was the cause of death, while drugs and/or disease were also being contributing factors. A number of the subjects were also overweight and when transporting such a person in a prone, secured position, it becomes extremely difficult for

any individual to breathe. With a combination of drugs, disease and obesity made the subject even more vulnerable to being denied proper breathing (Granfield et al.).

Reporting Requirements for Using OC

Documentation in the field of law enforcement cannot be stressed enough. It is vital that officers realize the importance of keeping field notes and documenting as much information as possible regarding confrontations with combative subjects. More often than not, testimony on actions taken in the field may happen months after the event and in some cases it may even be years before an officer will take the stand to explain their actions.

Any use of OC spray should be reported to the appropriate supervision within a law enforcement agency as soon as possible. Filing reports on the use of OC spray is essential whether the incident was intentional, unintentional, incidental spraying of a fellow officer, bystander, or other person or animal during intentional use of OC against a resistive subject (Concepts and Issues Paper, 1995). These reports should also be forwarded to the training department so that lesson plans for re-certification may reflect and minimize accidental discharges in the future.

Thorough, accurate, and expeditious reports will aid in successful prosecution of the subject and the defense of any allegations of excessive force by a law enforcement officers (Oleoresin Capsicum: Pepper Spray as a Force Alternative, 1994). The officer should note in detail from the initial contact in a chronological order the sequence of actions for all the parties involved. A crucial and often overlooked component is to note how the officer reduced the force applied as the resistance of the subject declined.

Most law enforcement agencies mandate that a use of force report be written upon using OC spray regardless of the circumstances. According to the policies and the study

of the Baltimore County Police Department in Maryland, the use of force reports are only completed contingent upon two elements of the result of force. The first reason a use of force report will be initiated is if the subject complains and the second reason will be if a subject goes to the hospital for treatment. If neither of these situations occur, then a use of force report is not required (Pepper Spray Evaluation Project: Results of the Introduction of Oleoresin Capsicum (OC) into the Baltimore County, MD, Police Department, 1995). The reasoning behind the Baltimore County Police officials not requiring a use of force report when pepper spray was deployed was the fact that no other less than lethal use of force required a report unless one of the above elements come into play.

The Los Angeles Police Department has a very detailed procedure for reporting the use of OC spray. The Los Angeles Police Department Training manual states:

The reportable use of chemical agents is defined as any incident in which any on-duty Department employee, or off-duty employee whose occupation as a Department employee is a factor, uses the device to: compel a person to comply with the employee's directions; or, overcome resistance by a suspect during an arrest or a detention; or, defend any person from an aggressive action by a suspect" (Use of Force Chemical Agent Control Devices "Oleoresin Capsicum", 1994, p. 8).

Regardless of the departmental policies that officers work under, clear, concise documentation of every event where force has been used is not only valuable but may be critical to the integrity and the career of a law enforcement officer.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

It was the purpose of this study to determine the effect OC implementation had on reducing citizen complaints of police brutality and injuries to officers during arrest situations. The following null hypotheses were tested:

Ho1: There will be no significant difference in the number of reported incidents of police brutality before and after implementation of OC spray.

Ho2: There will be no significant difference in the number and extent of officer injuries during arrests before and after implementation of OC spray.

Law Enforcement Agency Studied

The police agency examined for this thesis has an authorized strength of 163 full-time sworn officers and 30 civilians. The department is considered a medium-sized municipal department located in the southeastern United States. The department functions as a public safety agency, having all sworn officers trained and certified as police officers and firefighters. The department was at, or near, full strength throughout the period of study (1991-2001). The department turnover rate was five percent during the period with attrition resulting largely from retirement, with one percent of those officers leaving dismissed as a result of disciplinary actions.

The police department serves a city with a population of just over 55,000, with an average of 3.4 police officers per 1,000 population. The city in which the department is located covers 39.1 square miles. The city has a mixed economy with several major industrial employers. The city serves as corporate headquarters for 14 corporations with an employment level averaging 96.4 %. There are many community-based businesses,

and several shopping center areas outside the downtown center where the police department headquarters is based. A mid-size state-funded university in addition to several community colleges is located within a short distance of the city.

The police department uses a traditional organizational structure with two major divisions: operations and administration. The patrol division consisted of four platoons and an evening power shift. The power shift is assigned to the late evening to mid-morning shift. Specialization within patrol operations included crime prevention, special patrol, bicycle patrol, and special enforcements. Other specialized units within the police department included: D.A.R.E. (Drug Abuse Resistance Education), G.R.E.A.T. (Gang Resistance Education And Training), underwater search and rescue, S.W.A.T. (special weapons and tactics), school resource officers, and officers assigned to patrol the city parks.

The Detective Division is specialized in domestic violence, juvenile, and vice investigations. In addition, detectives were assigned to a special drug task force responsible for narcotics investigations within the controlling judicial district. One detective was assigned to work cases with DEA (Drug Enforcement Administration) and three detectives were assigned positions investigating crimes that occurred within public housing.

The department under study was granted accredited under standards of the Commission on Accreditation of Law Enforcement Agencies (CALEA) in 1992. The department had implemented all requirements for accreditation during 1990 and 1991. The official use and issue of OC spray for all officers in the study department was initiated in 1996. This allowed for an analysis of data prior to the use of OC spray (1991-1995) and after the implementation of OC spray (1996-2001).

Procedures for Collecting Data

The data collected for this research were gathered from the law enforcement agency and also from city records. The information compiled was taken from three independent and separate documents, all in use during the period under study (1991-2001).

The police department's Training Division provided suspect resistive reports that are a direct reflection of how much force the officers are using and in particular, what type of force is being used (i.e., baton, OC, use of hands/feet, and so on). These data are compiled from the use of force reports that the officers fill out when some type of force has been used to subdue a combative subject.

The police department's Internal Affairs Division provided statistical data on complaints associated with excessive force and the final dispositions of the complaints. The excessive force complaints were not broken down as to what type of force was used; however, given the number of oleoresin capsicum deliveries, there is some likelihood that the use of OC pepper spray may have been named in some complaints. At the time of the present study, this department had not been named in any criminal or civil litigations regarding the use of oleoresin capsicum, nor had the department recorded any in-custody deaths relating to the application of oleoresin capsicum.

Data regarding officers injured in the line of duty were acquired through the city Office of Risk Management. The statistics are compiled annually of any injury a city employee may incur. Careful examination of the files was conducted as to not include any injury report that was not a law enforcement officer. The files offer a date and a brief synopsis as to how the officer became injured. While reviewing the information, only the incidences where an officer was injured while subduing a combative, resistive subject

were pulled for comparison. The injury reports did not indicate whether or not the officer deployed oleoresin capsicum.

Procedures for Treating Data

Review and comparison were the first steps in the analysis of data. Rates of complaints against officers for excessive use of force and rates of injuries to officers during arrest situations were examined. In addition, these rates were dichotomized as the independent variable into prior OC implementation years and after OC implementation years (prior OC years being 1991-1995 and after OC implementation years being 1996-2001). The dependent variables under consideration were the percentage rates of complaints lodged against officers for excessive force and the percentage rates of officer injuries sustained during arrest situations. Rates (per 1000 arrests) were used rather than actual numbers to control for differences in departmental population strength and numbers of arrests during the 11 years studied. This resulted in a nominal dichotomized independent variable and a ratio level dependent variable with a two independent group design. This design was best analyzed using the comparison of means t-test to test the two null hypotheses.

CHAPTER 4

ANALYSIS OF DATA

The data were collected from a medium-sized law enforcement agency spanning an 11 year time period (1991-2001). The collection included the total number of arrests for the entire department for those years; the officer injury reports that were filed during this period; and, the excessive use of force complaints that were made against the department during this period. In addition, the types of physical force deployment used by officers during this time period were collected, including the use of OC, the use of baton, and the use of hands-on restraint by officers. The use of OC as a restraint device was officially sanctioned and issued to officers beginning in 1996 and has been in continued use since. This enabled a before-after data analysis approach to determine if the use of OC affected the rates of officer injury and excessive force complaints in arrest situations.

Table 1 depicts the actual numbers of arrests, officer injuries in arrest situations, complaints of excessive force by police, use of baton during arrest situations, use of hands-on restraint during arrest situations, and use of OC during arrest situations over the 11-year study period. Rates of officer injuries, excessive use of force, use of baton, use of hands-on restraint, and use of OC were calculated based on the number of arrests made for each year. The rate was calculated per 1000 arrests in order to compare across years. Arrests for each year reflect adult arrests as well as juvenile arrests.

As the data in Table 1 indicate, the numbers of arrests remained fairly stable with the exception of year 2001. The years 1991 through 2000 were consistent and reflected national rates for the same period. However, the year 2001 showed a significant increase

in the number of arrests. It is not known why this increase occurred. During this time period, there were no policy changes, organizational changes, or changes in training of officers. However, there was an increase of approximately five percent in the number of sworn personnel during the 2000-2001 period, which might account for increased numbers of arrests due to increased numbers of officers on the streets.

Table 1 also indicates that officer injuries tended to decrease over the 11-year time period with substantial decreases from 1996 through 2001, the time period where OC was implemented by the department. However, excessive force complaints increased during the same time period with substantial increases from 1996 through 2001, again the time period where pepper spray was used by the department.

The manner in which force was used is also contained in Table 1. The use of the baton dropped substantially from 1996 to 2001 as did the use of hands-on restraint by officers. This may be due, in part, by the implementation of OC spray during the same time period. Interestingly, the use of OC spray was highest during the first year of use, 1996, with a rate of use exceeding 22 per 1000 arrests. Over the next five years, the use of OC dropped and tended to plateau. This may be due to the newness of the product during the first year of use by officers. Officers may have discovered more about the use of oleoresin capsicum and began to use it less frequently. Meaning that the officers obtained a certain confidence in OC and would wait longer into a situation before delivering OC to a subject. It was then safe to deduce that pepper spray had secured a position with police officers as a use of force that was not just another passing “gadget” that would not last in the field of law enforcement.

TABLE 1

Distribution of Arrests, Officer Injuries, Excessive Force Complaints, and Method of Restraint

(Rates per 1,000 arrests)

		Year										
		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Arrests		5044	4860	4711	4822	4601	4936	5188	5845	4978	4806	6160
Officer Injuries	N	26	20	24	18	23	21	11	11	14	12	24
	Rate	5.15	4.12	5.09	3.73	5.00	4.25	2.12	1.88	2.81	2.50	3.90
Excessive Force Complaints	N	8	8	11	6	8	7	14	26	19	20	23
	Rate	1.59	1.65	2.33	1.24	1.74	1.42	2.70	4.45	3.82	4.16	3.73
OC deployed	N	0	0	0	0	0	111	96	103	89	65	69
	Rate	0	0	0	0	0	22.49	18.50	17.62	17.88	13.52	11.20
Baton Used	N	13	11	8	10	12	9	4	2	0	0	5
	Rate	2.58	2.26	1.70	2.07	2.61	1.82	0.77	0.34	0.0	0.0	0.81
Hands-On Used	N	52	53	42	36	48	28	32	31	15	17	42
	Rate	10.31	10.91	8.92	7.47	10.43	5.67	6.17	5.30	3.01	3.54	6.82

Examination of Hypotheses

The null hypotheses tested were:

Ho1: There will be no significant difference in the number of reported incidents of police brutality before and after implementation of OC spray.

Ho2: There will be no significant difference in the number and extent of officer injuries during arrests before and after implementation of OC spray.

The first hypothesis is detailed in Table 2. According to Table 2, the rates of reported incidents of police brutality (excessive force) tended to rise steadily over the entire 11-year study period with substantial increases in the last five years. The mean

rate of reported incidents of police brutality prior to implementation of OC spray was 1.71 per 1,000 arrests (1991-1995) and the mean rate of reported incidents of police brutality after implementation of OC spray was 3.38 per 1,000 arrests (1996-2001). The t-test was significant ($t = -3.128$, $9\text{ df} = 9$, $p = .012$, 2-tailed test). The sign of the t statistic indicates that a significant increase in the numbers of reported incidents of police brutality occurred during the years OC was implemented. This was somewhat surprising given that the literature indicated the use of OC would actually help reduce the incidents of reported police brutality. It is not known just why this would occur. One possible explanation would be the increased awareness of citizens regarding police use of excessive force and more willingness on the part of citizens to report such infractions. Another explanation could be that the availability of OC increases its use in arrest situations where, before OC was available, officers might have used more effective verbal communication on arrest-resisting suspects. The high rates of OC use as compared to other means of restraint (i.e., use of baton and hands-on restraint) tend to support such an explanation. Such an increase in use of OC spray might also increase the rates of complaints made by arrested individuals who had been sprayed with the product. The long-term effects of the use of the police baton shadow the temporary effects of oleoresin capsicum. One theory regarding the increase in citizen complaints may be attributed to the fact that a person has usually felt the pain of being struck sometime during their life, whether it was accidental or intentional. However, very few people have experienced the intensity of oleoresin capsicum sprayed into their face, even though the effects diminish rather quickly.

TABLE 2

Examination of Mean Rates of Excessive Force Complaints and Years Before and After Implementation of OC Spray

(Rates per 1000 arrests)

<u>Years Before OC (1991-1995)</u>	<u>Years After OC (1996-2001)</u>
1.59	1.42
1.65	2.70
2.33	4.45
1.24	3.82
1.74	4.16
	3.73

$t = -3.128, 9 \text{ df}, p = .012$ (2-tailed test)

The second hypothesis under examination is shown in Table 3. As the data in Table 3 indicate, there was a significant decrease in the rate of officer injuries in arrest situations over the 11- year period with substantial decreases during the years OC was implemented. The t statistic was 3.364 (nine degrees of freedom) which is significant at the .008 level (2-tailed test). The sign of the t-statistic indicates that a significant reduction of officer injuries occurred during the time period that OC had been implemented for the department. It is interesting to note that during those years where officers had the least injuries, OC was used most frequently (1997 and 1998). The only exception was year 1996, the year OC was first used by the department.

TABLE 3

Examination of Mean Rates of Officer Injuries During Arrests and Years Before and After Implementation of OC Spray

(Rates per 1000 arrests)

<u>Years Before OC (1991-1995)</u>	<u>Years After OC (1996-2001)</u>
5.15	4.25
4.12	2.12
5.09	1.88
3.73	2.81
5.00	2.50
	3.90

$t = 3.364, 9 \text{ df}, p = .008$ (2-tailed test)

Examination of Restraints Used Other than OC

To further test the validity of OC as an alternate source of restraint during arrest situations, t-tests were conducted on use of baton and hands-on restraints during the same time periods. As the data in Table 4 indicate, there was a significant difference in the use of the baton between the years in which OC was not used and the years OC was implemented. The t-statistic was 4.70, significant at .001 level of error (2-tailed test). The sign of the t statistic indicates that use of the baton dropped significantly from 1996 through 2001 as compared to previous years. Similarly, as the data in Table 5 indicate, the use of hands-on restraint dropped significantly during the same time period ($t = 5.117, p = .001$, 2-tailed test). These findings may reflect why officer injuries were reduced during the same period. Obviously, the risk of officer injury is greater when the officer must make contact with a suspect either by use of a baton or use of the officer's hands. OC spray can be deployed at a safer distance from the suspect thereby reducing risk of officer injury. When an officer is forced to apply hands-on techniques to a combative

subject, the chances of either the subject or the officer becoming injured increases greatly. When the officer increases the level of force to that of the police baton, injury to the subject is highly likely and may be the beginning of many problems for the subject and the officer, once the incident is settled.

Historically, police officers have relied heavily on the use of a striking instrument as a means of defending themselves and the public. The outcome of this type of force was often times undesirable for both the officer and subject. The use of oleoresin capsicum has brought about a preferred type of force that may even eventually encourage officers to utilize interpersonal skills to problem solve and mediate.

The use of force reports gathered for this study did not have a section that allowed an officer to make notations regarding the use of conflict resolution through the use of verbal skills or counseling. It is a well-known fact in the field of law enforcement that officers sometimes refer to themselves as “marriage counselors”, “social workers,” and “therapists.” This reference to police officers says a lot for their role as a public servant. The police officer has to be prepared to adjust to several different situations. Police officers also possess a great amount of discretion while performing their duties. Their discretion for using force is hopefully somewhat governed by the force continuum. And, hopefully, more agencies are training officers to use good verbal skills and problem-solving before the force continuum has to be addressed. However, the push for professional law enforcement is evolving and the data gathered and tested in this study proves that statement.

Table 4

Examination of Mean Rates of use of Baton Before Implementation of OC and After Implementation of OC

(Rates per 1000 arrests)

<u>Baton Use Before (1991-1995)</u>	<u>Baton Use After (1996-2001)</u>
2.58	1.82
2.26	0.77
1.70	0.34
2.07	0.00
2.61	0.00
	0.81

$t = 4.70, 9df, p = .001$ (2-tailed test)

Table 5

Examination of Mean Rates of use of Hands-on Restraint Before Implementation of OC and After Implementation of OC

(Rates per 1000 arrests)

<u>Hands-On Before (1991-1995)</u>	<u>Hands-On After (1996-2001)</u>
10.31	5.67
10.91	6.17
8.92	5.30
7.47	3.01
10.43	3.54
	6.82

$t = 5.117, 9 df, p = .001$ (2-tailed test)

CHAPTER 5

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine the effect OC implementation had on reducing citizen complaints of police brutality and injuries to officers during arrest situations. The following hypotheses were tested:

Ho1: There will be no significant difference in the number of reported incidents of police brutality before and after implementation of OC spray.

Ho2: There will be no significant difference in the number and extent of officer injuries during arrests before and after implementation of OC spray.

Data were obtained by procuring reports of officer injuries, citizen complaints of excessive force (police brutality), and subject resistance in arrest situations. One medium-sized police department located in the southeastern region of the United States was used in the study. The department had implemented the use of OC spray in 1996. In order to test the hypotheses, it was necessary to collect data prior to OC spray implementation and after implementation. The time frame 1991 through 2001 was used for the present study.

The present study found significant differences in reported incidents of police brutality and in officer injuries in arrest situations before and after implementation of OC spray. While both null hypotheses were rejected, an unexpected result was found with respect to reported incidents of police brutality. There were significant increases in reported incidents of police brutality (excessive use of force) after the implementation of OC in the department under study. The significant reduction of officer injuries sustained

during arrest situations after implementation of OC spray was an expected outcome based on the literature. However, even though much of the literature indicated that using OC spray would result in fewer citizen complaints of excessive force, this study found the opposite. This could be explained by the fact that OC was used far more frequently than any other form of physical restraint. Prior to OC being available, officers may have used more verbal communication efforts to subdue suspects and used hands-on restraints or a baton as a last resort. Oleoresin capsicum may have actually been used instead of more verbal communications by officers. This would also explain why officer injury rates were significantly lower after implementation of OC spray. There is a much greater risk of officer, as well as suspect, injury when a contact form of restraint is used, whether it be with hands and feet or with a baton. OC spray can be used at a safer distance from the suspect.

Implications

The information regarding the importance of oleoresin capsicum and the implementation of OC into the law enforcement force continuum presents a very convincing argument for any police agency that has not yet made this incorporation. It also makes a convincing argument that OC spray should not replace verbal communications efforts on the part of officers. The fact that more complaints of excessive force were shown in the present study tends to support this contention.

Chemical agents play an important role in most modern use of force policies and have become common place among local and state police agencies (Smith & Alpert, 2000). Law enforcement officials constantly seek alternative uses of force that are both safe for the officer and the subject. Admittedly, experiencing oleoresin capsicum is not

pleasant, but the effects are not permanent, and most individuals who have experienced OC do not want that experience again.

This thesis approached oleoresin capsicum from an objective point of interest and was careful to present all the available information regarding oleoresin capsicum in the literature. Ultimately, the decision to use OC will be made by police administrators, and hopefully, they too will gather all the facts and carefully evaluate the advantages and disadvantages.

Recommendations

The implementation of oleoresin capsicum into the law enforcement force continuum still remains a solid decision. When comparing the use of OC to the use of a PR-24 police baton, the answer is quite obvious. The baton has a much greater risk of permanent injury to a suspect than OC spray.

To obtain a better understanding of the effectiveness of the force continuum, intricate measures of tracking successes and failures should be implemented. The result of such tracking would reflect on the direction of training as well as new policy and procedure for the department. Every department is different and has different operating procedures, tactics, and service populations. Every department should gather data and evaluate new tactics to determine effectiveness and if more training is necessary. As the present study indicated, there was an increase in citizen complaints of brutality after implementation of OC spray. This should be carefully examined and training programs designed to address this problem. As this study has shown, reliance on outside data may result in erroneous conclusions about effectiveness of a particular tactic, such as implementation of OC.

The authority of police officers was reviewed in the early 1980s by the United States Civil Rights Commission stating: Police officers possess awesome powers. They perform their duties under hazardous conditions and with the vigilant public eye upon them. Police officers are permitted only a margin of error in judgment under conditions that impose high degrees of physical and mental stress. Their general responsibility to preserve peace and enforce the law carries with it the power to arrest and to use force—even deadly force (Alpert & MacDonald, 2001).

The above statement gives meaning to the reason for this research. Police officers do possess an awesome power, but an officer's responsibilities far exceed that power. This is why police officers should have as many less than lethal use of force techniques as possible. Oleoresin capsicum has been a positive addition to the force continuum, giving officers a safe alternative to more lethal means of force.

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