

REDUCTION OF STRESS
WITH THE USE OF MASSAGE THERAPY
FOR THE FOREST PARK FIRE DEPARTMENT

By: Michael L. Rupp
Forest Park Fire Department
Forest Park, Ohio

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CERTIFICATION STATEMENT

I hereby certify that the following statements are true:

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ABSTRACT

In the profession of firefighting, stress associated with emergency service personnel has caused physical and mental health problems. This study addressed the effectiveness of a regular 30-minute on-site massage provided by an Ohio licensed massage therapist to City of Forest Park Fire Department employees.

Subjective and objective criteria were used to evaluate effectiveness.

Research questions were:

1. Did massage therapy effect employee perceived stress level?
2. Did massage therapy help the employee recover from an emergency detail?
3. Did massage therapy effect blood pressure, pulse, and oxygen saturation?

Procedures allowed participants to fill out all applicable questionnaires.

Results indicated this study did not have a typical reduction of blood pressure compared to others researched. Forest Park Fire Department employees indicated subjective stress reduction and an improved sense of well-being.

Recommendations include establishing massage therapy teams for other departments.

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INTRODUCTION

Statement of the Problem

In the profession of firefighting, stress associated with emergency service personnel has caused physical and mental health problems. This study addressed the effectiveness of a regular 30-minute on-site massage provided by an Ohio licensed massage therapist to City of Forest Park Fire Department employees. The specific problem this study investigated was the effect massage therapy had on the amount of stress associated with the everyday stressors firefighters face.

Stress was measured before and after each massage.

Stress is part of every organization, but it is even more evident in the fire department. Shift work, (24 hours on and 48 hours off) can be detrimental to our eating habits, our sleeping patterns, and strains on the firefighters personal life. Since the September 11, 2001, terror attack on the World Trade Center and the Pentagon, firefighter's life styles and work habits have been in the forefront of the media and the general public. The news media seems to bring up the terror attacks whenever they see fit, which adds even more stress to the firefighter. (Lemanski & Samuels 2003)

Stress can result whenever firefighters are faced with life and death situations,. The stress associated with these events can cause the job of firefighting to be increasingly stressful. Over time this stress will accumulate and can lead to depression or post-traumatic stress disorder.

There are also those types of emergency details that linger in firefighters' and paramedics' minds for years. S. Ashbrock Fire Chief, Madeira Indian Hill Joint Fire District (personal communication October 20, 2004) stated:

When I first became a firefighter in 1978, we were called to an infant non-breather.

When we arrived on the scene, the mother handed me the infant, who was not breathing.

We took the infant, started CPR and transported to the hospital where the infant was pronounced dead. I can remember this detail as though it was yesterday. Picking up that infant is like picking up a lifeless doll.

This is one example of emergency details that contribute to our stress.

Purpose of the Study

Stress is inherently built into daily life. Firefighters face additional stress, however, when called to help someone, firefighters take on a set of stressors that most people will never encounter.

The purpose of this study determined whether massage therapy, provided for Forest Park Fire Department firefighters while on duty, would have an effect on their perceived stress levels. Each day, fire service administrators may use the results of this research in terms of increasing the quality of life for their employees. The researcher has determined when Forest Park Fire Department employees are healthy and happy they are efficient, effective employees. This is especially important in the fire service.

Effectiveness of massage therapy for the Forest Park Fire Department was measured via objective and subjective criteria.

After reviewing the impact of massage therapy with Forest Park firefighters, a plan to establish and implement massage therapy teams to other departments was introduced and placed into service. A 30-hour training program designed by the Forest Park Fire Department Division of Training (Captain Craig Bryan) and the After-Crisis Care Coordinator (Sister Mary Lou Knapke) has introduced and placed licensed massage therapist(s) into the firehouse culture.

The After-Crisis Care Team members are chosen by Mary Lou Knapke, Coordinator, Captain, Craig Bryan, and Assistant Fire Chief, Mike Rupp. The team members are a group of

Ohio licensed massage therapists who are interested in reducing stress within local fire departments. The team members are volunteers who are also given the opportunity to be a part of the Critical Incident Stress Management Association.

The training program for the team members are given the opportunity to observe firefighters making emergency details. During their training, team members are allowed to make both fire and emergency medical details. Team members are also permitted to attend any fire prevention programs and/or training sessions that the Forest Park Fire Department is conducting during their 30-hour program. Lastly, massage therapy sessions are conducted on Forest Park Fire Department employees.

Research Questions

The method used in this research was evaluative through subjective and objective criteria. The following questions researched the effectiveness of massage therapy on the stress level of the firefighter.

1. Will massage therapy affect the perceived stress level of the employee?
2. Will massage therapy help the employee recover from an emergency detail?
3. Will massage therapy affect blood pressure?
4. Will massage therapy affect pulse rate?
5. Will massage therapy affect oxygen saturation?

BACKGROUND AND SIGNIFICANCE

The Forest Park Fire Department (FPFD) began serving the community of Forest Park in 1961 as a volunteer fire department. While celebrating Forest Park's 40th anniversary as a city in 2001, this department became aware of the impact it had on this city's past and would hope to have on its future. The fire department has been a major part of the city's growth. The City of Forest Park is the third largest city in Hamilton County, Ohio. A suburb of Cincinnati, it has a population of approximately 20,000 within six and one-half square miles. It services a portion of Springfield Township and provides paramedic services for the Village of Greenhills.

The Forest Park Fire Department service to the community includes advanced life support (paramedic service) and fire protection with twenty-eight full-time employees and twenty-eight part-time employees. Daily staffing consists of nine firefighters covering two stations, seven at headquarters and two at the Cohn Station (Station 2). The department handles approximately 1,100 fire details and 2,100 emergency medical services (EMS) details per year.

This high demand for emergency service is a source of increased levels of stress associated with the job of firefighting. The department averages approximately ten emergency details a day. Historically, some of these details are serious in nature, i.e., treating an infant non-breather, an auto accident involving a friend or loved one, loss of life within a fire scene. These circumstances contribute to increased levels of stress for Forest Park firefighters. These types of details can cause severe stress and can be detrimental to the quality of life of the fire department employee.

Recent studies by the Los Angeles Fire Department's psychologist found that more than half the city's paramedics are burned out and suffering from emotional exhaustion.

About a third are dogged by extreme stress-the kind experienced by Vietnam vets who have seen and done too much. (Streeter, 2000)

Administrators of any organization must attempt to make the quality of life for all of its employees as healthy as possible. Therefore, the justification for fire department administrators to look for opportunities to lower the stress level of the employees became obvious. Fire department administrators have become accustomed to reliance on critical incident stress management teams after or during an extremely stressful emergency detail, but the day-to-day stressors take a long-term toll on the quality of life of a typical firefighter. The proactive approach of bringing massage therapy to the Forest Park Fire Department is one avenue in our exploration toward controlling those day-to-day stressors. The results of the study are encouraging and will ultimately lower stress levels of the Forest Park Fire Department employee. This type of “out of the box” thinking is one way to lower cumulative stress levels of Forest Park Fire Department employees, thus enabling them to remain healthy.

An Ohio licensed massage therapist, Mary Lou Knapke, S.C., L.M.T., contacted the Forest Park Fire Department to discuss massage therapy for firefighters. As a member of the Cincinnati Sisters of Charity and the Coordinator of the Sisters of Charity Crisis Response Initiative Team, she took several teams to New York City during the terror attack of September 11, 2001 to provide massage care to police, fire and emergency personnel during the 9/11 Crisis.

Upon returning to Cincinnati, she searched for a fire department willing to bring licensed massage therapy into the firehouse culture. Her experience in New York City and obvious differences made to the firefighters and police officers were the driving force she recognized that massage therapy reduced stress on New York City emergency workers. The potential positive

impact of this project to bring massage therapy to the Forest Park Fire Department was put into practice.

This research project began in September 2003 and ended in May 2004. Sister Mary Lou started her acclimation into the Forest Park Fire Department in July 2003. She attended daily briefings and became acquainted with all of the firefighters prior to beginning the research project. This period of being present with no agenda other than to listen and to be attentive to those she encountered increased the comfort level of employees, allowing them to also get to know Sister Mary Lou on a personal basis. This proved to be invaluable to both Sister Mary Lou and to the employees; even those who did not participate in the research project.

The potential impact this study could have on the Forest Park Fire Department is significant. The extreme stress that firefighters face when working in emergency scenes takes its toll. Because stress can impede functionality, it is advantageous to seek ways to lower the stress levels in any business, especially fire and emergency service. According to the Institute for Labor Statistics, firefighting is among the most stressful professions.

The stress rating scale developed by the University of Manchester Institute of Science and Technology, miners rank first with a rating of 8.3 (10 being the highest), followed closely by police (7.7) and prison officers (7.5). Aside from the risks involved in mining, their psychologically stressful workplace induces more anxiety. Police and prison officers, on the other hand, have to contend with outlaws and place their lives at risk most of the time. Therefore, stress to them comes in daily doses. Construction workers, airline pilots, and journalists share the same stress level at (7.5). Advertising executives and dentists rank a notch lower (7.3). Actors (7.2), doctors (6.8), broadcasting personnel (6.8), and nurses (6.5) closely trail behind, followed by film production crew (6.5),

ambulance personnel (6.3), musicians (6.3), firefighters (6.3), teachers (6.2), social workers (6.0), and personnel managers (6.0). (Cruz, 2003)

It is interesting to note that out of the 19 most stressful jobs, four come from the health care sector. This is because this field requires urgency especially during emergency cases and tends to lead to work overload. They are pressured to improve the patients' physical condition as well as provide emotional support to relieve the patients' stress. This pressure is particularly obvious among nurses who have to take care of critically ill or dying patients. (Cruz, 2003)

Controlling stress is typically not an issue for fire department administration unless an employee shows outward signs for concern or has been placed on permanent or total disability. When this happens, it is usually too late to address the issue. Therefore, a more proactive approach to address the stress that firefighters encounter was researched. The Forest Park Fire Department chose massage therapy as a tool that might impact stress levels of those engaged in fire and emergency service.

In November of 2002, the Smithers Institute at Cornell's School of Industrial and Labor Relations announced that it would study and survey more than 2,000 firefighters and fire officers on post-traumatic stress, drinking, anxiety and depression.

Sixty-two percent of the survey's participants were involved in September 11 rescue and support efforts. Firefighters who reported seeking help for emotional problems rose by 50%. Moreover, according to the study's results, firefighters who still suffer from post-traumatic stress from those events report higher levels of depression, anxiety, stress, and an increased risk for drinking problems. This was a good time to highlight some of our preliminary findings for the unions and the department. These

guys are under strain. Depression is up; anxiety figures are up. All the basic indicators are really up. (Bacharach & Meyers 2004 pp.1-2).

In May of 2004, forty Line of Duty Deaths (LODDS) have been reported to USFA/FEMA. Like every year the leading cause of death remains “stress/exertion” in the fire-rescue service. Sixteen victims suffered a fatal heart related episode range in ages from 35 to 70. (Smith, March 2004 pp.1-2).

At first glance, it may seem obvious that putting one’s life on the line battling fires can be stressful. Firefighters spend relatively little time fighting major fires, and a great deal of time, perhaps as much as 80%, responding to aid calls, minor fires, and other types of emergency medical assistance. A great deal of firefighter depression and burnout comes from a sense of being misused by the system and the public.

Some firefighters feel that they are on duty for emergencies only. The trend of the fire service is to change this type of thinking to the thought that “anything and everything” is an emergency service. While being called to assist a customer back to bed may not seem to be an emergency to some firefighters, however, the customer needing assistance considers this an emergency. All customers must be treated with respect, even when it becomes obvious the incident may not be a true emergency. In the eyes of the customer, this incident is a true emergency.

Emergency medical work offers its own set of traumatizing factors, which, along with real stresses of fighting fires, can lead to depression, burnout, abuse of alcohol, and even post-traumatic stress disorder. Treating seriously injured accident victims, tending to the dying, and the repeated risk of infection from exposure to bloodborne pathogens are experiences that may leave hidden emotional scars. Over time, this type of accumulative stress can build.

Randall Beaton is also exploring the role of leaders in the fire departments, both as a cause of stress among the companies and as subjects of stress themselves. Beaton believes there is both a real and perceived lack of leadership in many fire companies and has begun a new study focusing on leadership intervention for fire personnel. “Leaders typically receive little formal training yet they are entrusted with life or death decisions in the event of a major fire.” (Beaton, 2004 pp. 1-2)

Reduction of stress should be a goal of every fire chief. In the past, peers and supervisors have looked at stress negatively. Stressed employees are seen as those who can't handle the job. Underlying reasons the employee has these stress levels need to be explained and remedied. Massage therapy can be one way of assisting an overly stressed employee to be more balanced and productive, thus providing an impact on the stressed employee to return to a productive employee.

Healthy, productive employees are employees who love their job. These employees are rarely discipline problems. On the other hand, employees who are not mentally healthy usually have underlying reasons. If stress is one of the reasons, it is important to move toward an avenue that will combat this problem.

LITERATURE REVIEW

WILL MASSAGE THERAPY EFFECT THE PERCEIVED STRESS LEVEL OF THE EMPLOYEE? It stands to reason with lower stress levels, firefighters who are on emergency details can deliver their best performance. Back massage has been researched in healthcare and government workers as a possible stress-reducing technique for the workplace. There were significant reductions in blood pressure, anxiety, depression, and fatigue as well as an increase in vigor from before to immediately after massage.

“These studies show that charting perceptual changes as well as physiological indicators of blood pressure are appropriate methods to measure the effects of massage in the recipients.” (McNamara, Burnham, Smith, Carroll, pp. 1-2)

In the State of Ohio massage therapists are licensed under the Ohio Medical Board. “Most massage therapists know that the tiny nerve terminals called receptors, such as Golgi Tendon Organs and Muscle Spindles, cause muscles to contract and relax.” (Dalton 2004 p. 79) Using massage in site-specific areas can reduce the stress level on the employee. Neck massage can help to restore a sense of calm and inner balance thus assisting the body to achieve homeostasis.

“Receptors detect sensory stimuli such as touch, pain, heat, sound, light, and cold, and communicate this information to the central nervous system. An efficient neurological feedback system then informs the brain of changes in the person’s overall body environment.” (Dalton, 2004 p. 80)

Chronic Pain: In a remarkable feat of engineering, the neck’s sturdy but flexible system of muscles, ligaments and fascia provides support for the ten-pound head, while allowing flexion, extension, rotation and side bending in countless combinations. When something

goes haywire, the neck becomes painful, resulting in devastating and widespread effects. Myofascial release, deep-tissue, trigger point and assisted-stretching techniques effectively lengthen shortened or hypertonic muscles while strengthening exercises address the weak, inhibited tissues. (Dalton, 2004 p. 81)

Firefighters can face chronic pain if their health is not in peak condition. Chronic pain can lead to an inability of the firefighter to conduct fire and EMS activities. If persistent, this pain can end an employee's career. Using massage therapy to combat this problem, quality of life for the employee may be extended.

Traditional massage therapy maneuvers successfully trigger cutaneous receptors in the skin and superficial fascia, thus promoting a temporary relaxation response. As the tissues elongate, blood, oxygen and vital nutrients replenish the cells, as waste products are carried away. However, for stubborn chronic pain conditions, articular receptors must also be coactivated by adding enhancers to the session. (Dalton, 2004 p. 79)

Licensed massage therapists have knowledge of human anatomy and physiology. They understand how massage procedures provided in site-specific areas can help the client to combat chronic pain.

It is now known that chronic muscle imbalance patterns develop from abnormal afferent information, due to poor posture, trauma, joint blockage, emotional stressors and habitual movement patterns. Massage therapists need to understand this reflexogenic influence that joints have on muscles that tug on cervical structure, and lead to long-term head, neck and scapular pain. (Dalton, 2004 p. 79)

Weak Muscles: When the brain senses weaknesses in an area, it quickly recruits surrounding muscles to splint the area, so that further insults to delicate neural structures

housed in the spine are prevented. There is enormous therapeutic value in the muscle spindle. It is considered the third-most-complex sensory organ after vision and hearing. Fortunately there are practical hands-on techniques that can effectively stimulate spindle fibers to turn on weak muscles. (Dalton, 2004 p. 81)

Weak muscles can be attributed to poor physical fitness. Those who are not working out may need to start on an exercise program. Massage therapy is not going to make weak muscles strong, it ultimately will allow for better circulation to the muscles that are weak. With physical fitness, the muscle will strengthen.

To confront muscle and joint imbalances and begin blocking chronic pain cycles, the therapists can approach the dysfunction in a couple of ways: Begin the muscle balancing session by lengthening the short, neurologically facilitated muscles that pull unevenly on the spine; or tonify the weak, inhibited muscles that permit the asymmetry.” (Dalton, 2004 p.81)

Correcting asymmetry of the muscles can help prevent injury in firefighters. It is imperative for the firefighter to assist with strengthening the muscles. Here again, it is imperative for site-specific massage to assist with the recipient of the massage to be able to relieve any pain and tonify the muscles.

“Tight Muscles: Traditional techniques that range from myofascial release, trigger point therapy and assisted stretching, to various deep-tissue modalities can be used to palpate and lengthen tight, short muscles.” (Dalton, 2004 p. 82)

Tight muscles are a leading cause of pain. When the muscle is exerted during a physical activity, such as firefighting, the muscle will tighten. It takes time for the muscle to recover from exertion. Massage therapy can reduce the amount of time needed to recover from over exertion.

Research has determined that structures, such as ligaments, fasciae, joint capsules and intervertebral discs, are innervated and can participate in normal neuromuscular reflexes, some of which result in pain. Myoskeletal therapy engages a joint's receptor system, using enhancers and activators. Enhancers can be any micro or macro movement performed by the client that puts an activating force through the neuromyoskeletal system to affect cutaneous, as well as articular receptors. This technique may be applied for the relief of chronic neck pain. (Dalton, 2004 p.87)

WILL MASSAGE THERAPY HELP THE EMPLOYEE RECOVER FROM AN EMERGENCY DETAIL? The stress that firefighters face on a daily basis can build over time and compound to a point when the employee will need some type of counseling.

Firefighters from New York City say the staggering losses of September 11, 2001 changed perceptions of the counseling unit, once seen as only for those with drug or alcohol problems. The department lost 343 members when the Twin Towers collapsed. "Before this, guys would not even dream of going to counseling," said ten-year firefighter Vinny Piciano, who sees a counselor once a week. "Now, the guys that are coming down, they realize something is wrong. Guys are hurting." Of the 350 placed on light duty or medical leave, about 100 remained off the active roster; many others have retired or returned to work. (Weissenstein, 2002 p. 1)

These are some staggering statistics. New York City firefighters see it all. When these firefighters are feeling this type of stress there must be some alternatives to combating this stress. Massage therapy is an alternative source or solution to this problem.

"An additional 650 fire personnel are on light duty or medical leave because of physical injuries, from respiratory ailments to broken bones. Some of them are also said to have

symptoms of extreme stress.” (Weissenstein, 2002 p. 1) The extreme stress linked to the New York City Fire Department is not what the average fire department will encounter unless they are called in to assist via mutual aid requests.

“About one-fifth of those in counseling suffer from post-traumatic stress disorder, a severe reaction that can require intensive counseling and medication,” Counseling Services Unit Director Malachy Corrigan said. (Weissenstein, 2002 p. 1) The counseling these firefighters are involved with may be on going. This can be a detriment to the department due to Workers Compensation laws. The goal of the department is to return these firefighters back to the mental capacity they were prior to the event.

The remaining 80% are experiencing acute stress disorder, a milder reaction that can improve after as little as a month of treatment. “Those who chose counseling have benefited from the individual attention,” said Tom Manley, Health and Safety Officer for the firefighters union. (Weissenstein, 2002 p.1)

WILL MASSAGE THERAPY EFFECT BLOOD PRESSURE, PULSE AND OXYGEN SATURATION? In the study, *The Effects of Back Massage Before Diagnostic Cardiac Catheterization*, the patients who were scheduled for cardiac catheterization had their baseline vitals lowered after the massage. “Systolic blood pressure was reduced a mean of 20 mmHg immediately after a 20-minute back massage and seven mmHg ten minutes after the 20-minute massage.” (McNamara et al.)

The reduction of blood pressure via the back massage is imperative to lowering the stress level of the patient prior to the surgery. With the lower stress level, the patient’s recovery time will be reduced.

Research has shown that the use of medications classified as beta-blockers and angiotensin–converting enzyme (ACE) inhibitors appears to have an effect on a variety of physiologic responses. During this research subjects were not in the best health and were in the hospital for cardiac catheterization procedures. Hence, these medications were already prescribed. (McNamara et al.)

Although this study was conducted on pre-cardiac surgery patients, it would be suggested that the same would be true for firefighters. The stress associated with making an emergency detail is similar to the stress of cardiac catheterization; even though the firefighter does not have the medical problem of the cardiac patient as suggested in the literature. For the firefighters, the majority are healthy and not taking blood pressure reduction medicines. Therefore, the blood pressure represents the firefighter's true blood pressure.

As healthcare providers caring for patients during life crises and potential life threats, back massage, as a nursing intervention, appears to benefit those who are awaiting a diagnostic cardiac catheterization. Healthcare providers must take the initiative to create a caring, healing environment. Back massage, as one approach, offers a human touch intervention that provides comforting and relaxing effects that put the patient in the best condition to receive healthcare. (McNamara et al.)

Firefighters are considered pre-hospital care providers. Therefore, back massage is an alternative way for healthcare providers' stress to be lowered.

The levels of cortisol (a potent stress hormone) in emergency personnel will surge to provide energy to get them through a stressful event. But the body is designed to handle stress for short intervals, not the chronic day in and day out stress of emergency work. Is it any wonder, then, that police officers, firefighters and paramedic personnel have a

higher rate of heart disease than any other group? Physical, emotional and mental stress elevates cortisol levels. In small amounts the body can adapt to elevated cortisol, but when cortisol stays elevated for too long it becomes deadly to every system in the body. (Scala, 2003 p. 1)

When emergency personnel are faced with a stressful situation and the body is pressed into a fight-or-flight response, the stress level is elevated. The stress must be alleviated immediately for the emergency worker to recover.

When stress persists for too long or becomes too severe, the body breaks down. Emergency workers are at the extreme end of the stress continuum and should be taken care of with new and improved treatment protocols designed for their specific metabolism. Therefore when firefighters are given their annual physicals, cortisol levels should be checked. (Scala 2003 p. 1)

Checking cortisol levels during routine physicals is an area that the fire department must institute to assist in checking the stress level of fire department employees. Another possibility would include checking cortisol levels in any physical a firefighter may have.

Firefighting is a physically and psychologically demanding profession, and a potentially hazardous occupation. During five years from 1993 to 1997, an average of 93 US firefighters died on the job. Leading cause of death among on-duty firefighters has been myocardial infarction. However, the magnitude of psychological strain has not been carefully studied. There is little information on how physiological stress will impact cognitive function, especially the ability to make decisions quickly and effectively. (Look, 2004 p.1)

Emergency workers must be able to make quick decisions. These decisions can result in property loss and/or death if decisions are not made quickly. Stress is an area that can impede the decision-making process.

It is not unusual for a firefighter to be unable to rescue a victim; thus he/she is witness to intense sights, such as the death or injury of another human being or the pain of a burn victim. Not surprisingly, firefighters experience guilt, anxiety, and depression after the event. The impact of critical incidents may be debilitating, with reactions ranging from recurrent intrusive images, persistent fear, displaced anger, guilt, and isolation. In the aftermath of 9/11, this issue is no longer hidden from the American public. (Bendersky, Sacks, Clements, Fay-Hillier, 2001 p.1)

When looking at national tragedies that involve heavy involvement of emergency services, such as 9/11, or the 1995 bombing of the Federal Building in Oklahoma City, some type of intervention is necessary before the stress reaches the crisis stage. After the bombing in Oklahoma City, research on the rescue workers found that eight emergency workers and three police officers committed suicide, police divorce rates increased 300% and police disciplinary problems rose 45%. Since 9/11, there are 75 New York City Fire Department members off the line for stress related issues. At any given time before 9/11, the average was five to ten. (Look, 1995 p.2))

It is imperative that a proactive approach to this type of stressful circumstances be addressed immediately. Critical Incident Stress Management (CISM) is not the only answer to this problem as was in the past. Massage therapy in conjunction with CISM is an avenue that must continue to be researched.

Firefighters sometimes witness episodes that are so far beyond the ordinary that they would evoke psychological distress in any healthy, normal individual; but because firefighters feel such a need to demonstrate that they are strong and in control, they often are reluctant to seek professional help on their own. (Look, 1995 p.2.)

When firefighters continue to have these reoccurring images of emergency details they have witnessed can cause the stress level of the firefighter to accumulate.

“A recent study in the New England Journal of Medicine found that one-third of Americans use alternative health therapies. Massage therapy was the third most popular following relaxation techniques and chiropractic care.” (Dellinger, Levine, Stamler, Young, Petty, *Legacy Massage Therapy Associates*, 2003, p.1)

The Body's Reaction to Stress:

- Inhibits the immune system and pain fighting mechanisms
- Breathing becomes rapid and shallow
- Pulse/heart rate speeds up
- Blood pressure increases
- Digestion slows down
- Production of adrenaline increases along with other hormonal activity
- Blood normally meant for the skin, brain and digestive organs is diverted to the skeletal muscles
- Brain function decreases
- Hands and feet become clammy and cold

Results From Regular Massage Therapy Sessions:

- Reduced muscle spasms and tension

- Greater joint flexibility and range-of-motion
- Better circulation of blood, lymph and oxygen
- Reduced blood pressure
- Healthier, better nourished skin
- Faster healing time
- Reduced pain and swelling
- Reduced formation of scar tissue
- Faster removal of metabolic waste products

The significance of the body's reaction to stress is very important to understand. With an increase in blood pressure and pulse rates the body attempts to compensate for this added stress. This added stress leads to the body's vital signs to be outside of the normal limits. When the vital signs are outside the normal limits the body must compensate by reducing the amount of stress exerted against it, or the body may need an outside source such as medicinal remedies.

Stress and overexertion remained the leading cause of fatal injury in 2003, as they have been almost every year. Last year, 47 firefighters died from stress-induced heart attacks. That's more than the 37 heart-attack deaths in 2002 and almost ten percent more than the average of the past ten years. (Lemanski, 2004)

Because stress/exertion is the leading cause of heart attacks in firefighters we must be proactive in our approach to reducing stress.

Eleven of the 47 heart-attack victims in 2003 were known to have heart problems (usually previous heart attacks or bypass surgery.) NFPA studies consistently find that about half the victims of fatal heart attacks had suffered previous heart attacks or

undergone bypass surgery and an additional third had severe narrowing of the arteries.

Comprehensive safety and health programs, such as those outlined in NFPA standards could prevent such fatalities. (Lemanski, 2004)

It's well known in the fire service that stress/exertion along with heart attacks, or myocardial infarctions, are the leading cause of line of duty deaths (LODD).

In 1999, the National Fire Protection Agency reported that 112 firefighters died in the line of duty. Of those 112 firefighters, 51 deaths (46%) were attributed to heart attacks. Another seven firefighters died of other cardiovascular related problems: two of aneurysms, two of pulmonary emboli and three of strokes. (Smith, 2001,)

Firefighters are sometimes their worst enemies. When they find themselves having chest pain they have a tendency to disregard the warning signs. When these warning signs appear they must be examined. Some of their eating habits are not what they should be, thus resulting in the narrowing of arteries, which could result in a heart attack.

In conclusion, stress associated with firefighting is causing our firefighters to die. Job related stress must be reduced. By reducing stress the firefighter may avoid the ultimate sacrifice. Health care, psychological care and critical incident stress management are currently used to combat this problem. The literature suggests that using massage therapy for emergency workers is an avenue that can ultimately reduce the amount of stress in firefighters and may lead to a reduction health problems and line of duty deaths.

PROCEDURES

This research project measured stress that firefighters experience on a daily basis before and after a 30-minute massage. By taking this proactive approach the study tracked each employee's perceived stress level before and after a 30-minute upper body Swedish procedure massage. The massage time is comparable to a break at work for the same amount of time.

The firefighter measured his/her stress level by filling out a questionnaire before and after each massage therapy session. The stress level was measured via subjective and objective data collection. Measuring stress can be very difficult. The stress level was tracked throughout this process. By taking the firefighters blood pressure, pulse rate and oxygen saturation before and after each massage session provided a baseline of measurement.

All on-duty employees were given the opportunity to receive a massage once a week while scheduled to work. Participants filled out a short questionnaire after the massage. Mary Lou Knapke, S.C., L.M.T., was on-site three days a week to conduct the massage for employees who worked the 24/48-hour work schedule. A brief confidential health history was taken. HIPPA (Health Insurance Portability and Accountability Act of 1996) regulations were followed.

The massage therapist and the researcher strictly followed the HIPPA regulations. Each employee was given a number that was used to track the employee. Only the massage therapist and the researcher knew the number that was issued. This allowed the researcher and massage therapist to be able to keep this information private and was not able to be tracked back to the employee. This privacy regulation developed by the Department of Health and Human Services is there to protect the employee so such medical information can not be given out to anyone without the participant's permission.

There were times when the massage therapist was not able to be at the firehouse. When this happened, the next-scheduled day was documented. There was a pre-and post-program questionnaire to determine the employee's knowledge of massage therapy. The post-program questionnaire was used to determine the effectiveness of the program.

The massage protocol consisted of:

- Thirty-minute upper body massage with Swedish massage protocol and procedures of touch, stroking, friction and kneading
- Head, neck, arms, hands, chest and back
- Massage lotion was used
- Aromatherapy, water fountain and relaxation music were also available although not always utilized.

Initial Session

A confidential health history of each participant remained with the massage therapist. Notes taken in each session were kept with this history along with a signed HIPPA form. Participants filled out a Health History (Appendix 1) and a Pre-Program Questionnaire (Appendix 2), which were used in this study. The pre-program questionnaire was used to determine what the employee felt about the program. By determining this, the researcher was able to determine the employee was able to be straightforward on their findings. (Appendix 4)

The comments heard around the firehouse about the program question were asked to determine if the employee had any pre-conceived opinions about the program. This also allowed the researcher and the massage therapist to see what was being said by other firefighters. (Appendix 5)

The question reference the reason the employee participated in the program was asked to find out why the employee wanted to participate. (Appendix 6) The attitude about massage question was used to determine if the participant had any preconceived attitudes about massage therapy. The issue with massage having sexual overtones was an area of concern the researcher wanted to avoid. (Appendix 7)

The question concerning how the participant handles stress in his or her life was asked to see if there were alternative ways to manage stress in the firefighter's life. (Appendix 8) The question concerning previous massage therapy experience was asked to determine how many firefighters have had massage in the past. For those who have not had a massage before, this was an opportunity to introduce the firefighter to professional massage techniques.

The question concerning the identification and location of where stress is held in the body was asked to learn if the firefighter knows where the body holds and feels stress. If there was a common area that stress was being held, then the massage therapist was able to focus on that area during the session. (Appendix 10)

Before Each Massage Session

The employee had blood pressure, pulse and oxygen saturation measured recorded and tracked. The blood pressure was taken in the seated position using standard blood pressure equipment. This objective data was used extensively in this research. By taking this proactive approach we would be able to help identify any participants that may have high blood pressure. The research did have one participant discover they had high blood pressure.

After Each Massage Session

Participants filled out a Post-Massage Questionnaire (Appendix 3). Blood pressure, pulse, and oxygen saturation were taken and recorded. The blood pressure was taken after the participant was dressed and seated using the same standard blood pressure equipment.

The question “prior to your massage did you experience muscle tension or pain” was used to focus on areas needing massage. Additional attention to site-specific massage areas was given to address the tension and/or pain the firefighter may have. The question “after your massage did you experience any muscle tension or pain” was used to track how effective the massage was in addressing muscle tension or pain.

The question “during the massage what was your stress level” was a subjective response by the participant. This subjective data determined what the participant’s understanding of their stress level was prior to the massage. This provided an understanding on where the employees’ understanding of their stress level was prior to the massage.

The question “after the massage what was your stress level” was used to track just how effective the participant perceived the massage therapy session was. The massage therapy session tracked whether the employee’s subjective answer to their stress level increased or decreased.

The question “before this massage I have handled ___ number of emergency details” was used to try to determine if the number of emergency details the employee handled had any effect on their stress level. The question “was the massage interrupted by an emergency detail” required a simple yes or no answer. The researcher tried to determine how many times a massage therapy session was interrupted. This was easy to discover.

Upon Completion of the Research

All data was evaluated by the researcher to determine the effectiveness of massage therapy in reducing firefighter stress. A training team consisting of Mary Lou Knapke, S.C., L.M.T., and fire personnel was developed. The After-Crisis Care Team training program for volunteer massage therapy was developed for implementation into local fire departments. A 30-hour training program of volunteer Ohio Licensed massage therapists includes 10-hours of ride-along time. It stresses the dealing with the firehouse culture, ethics, confidentiality, equipment and firehouse protocol. The After-Care Team is a team of volunteer Ohio Licensed Massage Therapists.

Of the fifty-six employees of the Forest Park Fire Department thirty-one employees participated in this study. This was strictly a voluntary study by those who chose to participate. Reasons for non-participation were not researched in this study. Making this mandatory would have resulted in labor issues that would have increased the stress level of the employee.

Definition of Terms

Angiotensin-Converting Enzyme: Medications that widen blood vessels and lower blood pressure.

Autonomic Nervous System: Autonomic Nervous System (ANS) which regulates individual organ function and homeostasis, and for the most part is not subject to voluntary control. It is also known as the visceral or automatic system.

Beta-Blockers: The beta-blockers (examples: atenolol, metoprolol, propranolol) act as competitive antagonists at the adrenergic beta-receptors. The newer agents tend to be more selective for the cardiac (beta-1) receptors, which allows for decreased systemic side effects. Most of the generic names for beta-blockers end with "olol".

Cardiac Catheterization: The process in which a catheter is inserted by a physician into a blood vessel all the way to the heart in order to obtain information about the heart and the coronary arteries.

Cortisol: The hormone cortisol is secreted by the adrenal glands in response to any kind of physical or psychological stress.

Electrocardiogram (ECG): A painless very common test that records the heart's electrical activity as a graph on a moving paper or video monitor.

Fascia: A sheet or band of fibrous connective tissue enveloping, separating, or binding together muscles, organs, and other soft structures of the body.

Golgi Tendon Organs: Function to protect the muscle and connective tissue from injury. Are stimulated with excessive tension during muscle shortening or when the muscle is stretched passively, causes a reflex inhibition of the muscle.

Homeostasis: The ability or tendency of an organism or cell to maintain internal equilibrium by adjusting its physiological processes.

Myofascial Release: Myofascial Release Therapy (MRT) is one of the soft tissue techniques used to release tight spots within muscles that irritate nerves and contribute to chronic pain conditions.

Parasympathetic Division: The preganglionic outflow of the parasympathetic nervous system arises from the cell bodies of the motor nuclei of the cranial nerves III, VII, IX and X in the brain stem and from the second, third and fourth sacral segments of the spinal cord. It is therefore also known as the cranio-sacral outflow.

Limitations of the Study

One limitation addressed in this study's outcome was the impact of a remodeling project at the Forest Park Fire Department's headquarters station. This remodeling project went on during the study and was very extensive; the complete downstairs was gutted and remodeled. This proved to be an obstacle that was overcome. Prior to the start of the study an area was set up to conduct the massage therapy in the downstairs bunkroom. This proved to be conducive in conducting massages. The massage was then moved to an upstairs administrative office--the noise associated with the construction proved to be a limitation.

Firefighters' work schedules were very difficult to work with when conducting this type of research. The 24-hours on and 48-hours off was a deterrent to collecting high amounts of data. For example, employee "A" is scheduled to work on and receive a massage on Wednesday; however, Wednesday turns out to be a very busy day with emergency details and training. By the time employee "A" finds time to get a massage, it is already 4:00 pm and the massage therapist has left. His or her next scheduled day is Saturday and massages are scheduled on Wednesday, Thursday, and Friday. Now if employee "A" is at school, vacation, or sick, the employee may not see the massage therapist for two weeks.

Another limitation was objective vs. subjective information: Distinctions are often drawn between subjective and objective information. Objective information is the kind of information we get from actually observing. We can measure blood pressure in industry standard fashion. We count heart rate as we take a pulse rate. We may have someone connected to an Electrocardiogram (ECG) and the heart rate is viewed on the screen of the machine. You take out a stethoscope and count how many times the patient is breathing. These are objective measures. Skin color and sweating are observable.

Subjective information is what we interpret, or what the patient may tell us. In other words: “I’m feeling sick,” or “I’m feeling depressed,” or “I’ve noticed I have some pain in my neck.” These feelings cannot be seen or measured, but yet it is real to the individual and needs to be noted as part of any patient’s assessment. In any kind of patient work that we do in the field the objective—what we see and measure—versus the subjective, what the patient tells us they think is happening and their whole experience must be considered. Subjective data that has been collected in this research is what the participant personally experienced.

Stress research has identified both subjective and objective components to the feelings and manifestation of stress. So, despite problems with the subjective measures included in this research, they are included and important.

Another limitation was the issue of taking blood pressures. When the participant came into the room to receive massage therapy, the blood pressure was taken in the seated position and dressed. After the massage was completed, the massage therapist left the room. The participant then got dressed and was seated. The blood pressure was taken in the seated position. The researcher believes that had the blood pressure been taken while the participant was still supine prior to getting dressed, the results may have been different.

RESULTS

This research began on September 1, 2003 and ended on May 10, 2004. Once the participant filled out the questionnaires, this data was collected and tabulated.

Research question #1 was, “did massage therapy effect the perceived stress level” of the employee? Results from this research have proven that massage therapy does reduce the stress level of the firefighter. Each firefighter was asked after receiving their massage, “did their stress level increase or decrease.” The overwhelming subjective response that massage therapy did reduce the stress level of the firefighter has proven this as a worthwhile approach to addressing the stress level of the employee.

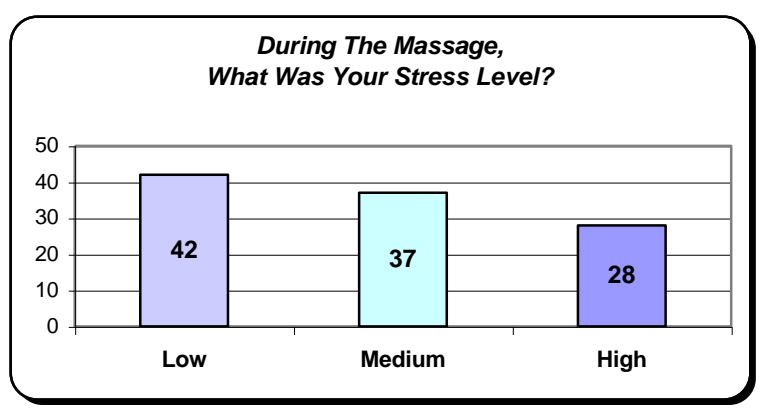


Table 1

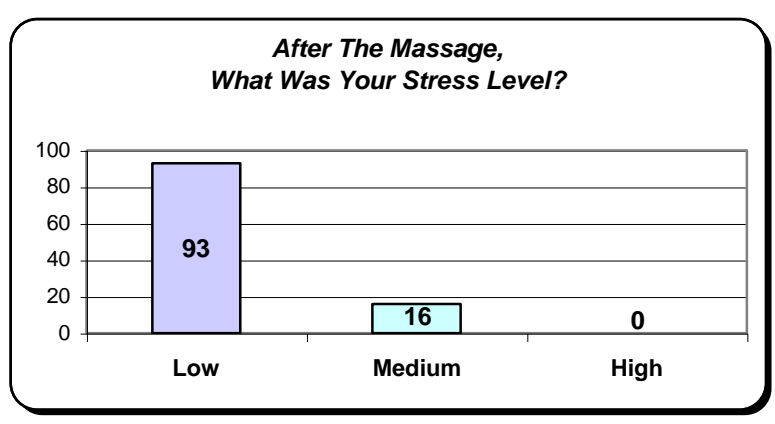


Table 2

The fact that after the massage was conducted and the vast majority of the participants felt that their stress level was reduced continues to prove that massage therapy conducted on firefighters reduces their stress level.

Research question #2 was, “did massage therapy help the employee recover from an emergency detail?” The results on this question also had positive outcomes. There was limited data available to compare, however, the data that was compiled was very useful. There were only sixty-six emergency details handled prior to the massage therapy sessions. The data compiled showed that of those sixty-six emergency details, thirteen firefighters subjectively felt that their stress level was reduced as a result of receiving massage therapy after the emergency detail.

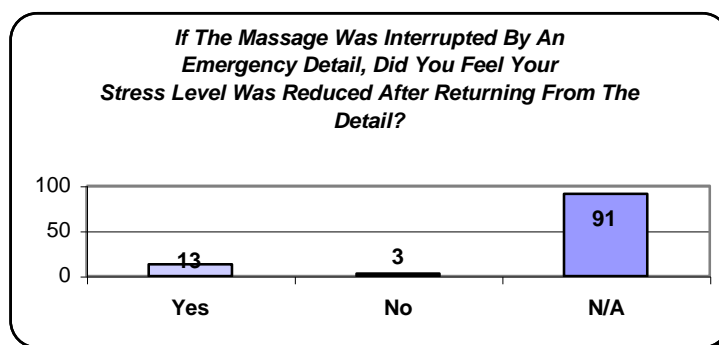


Table 3

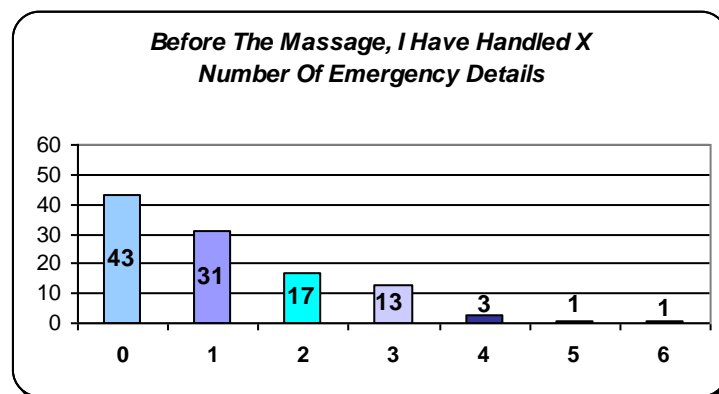


Table 4

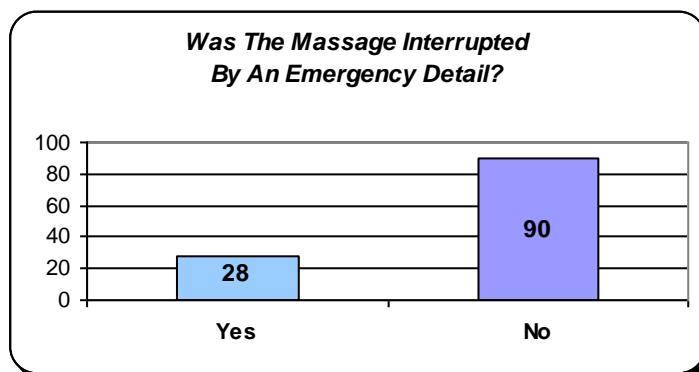


Table 5

Question #3 was, “did massage therapy effect blood pressure, pulse, and oxygen saturation?” The blood pressure data compiled did not have the effect as those who have researched this subject in other studies.

Blood pressure was taken prior to and after receiving a massage. There was not a significant reduction in blood pressure. The results may have had a different consequence if the blood pressure readings were taken while the firefighters remained in the supine position after the massage therapy session. The blood pressure readings were taken after the firefighters had gotten dressed and were in a seated position.

The results of other studies have revealed a 20-mmHg decrease of blood pressure. The results of this study showed on average a 0.72 mmHg increase in blood pressure.

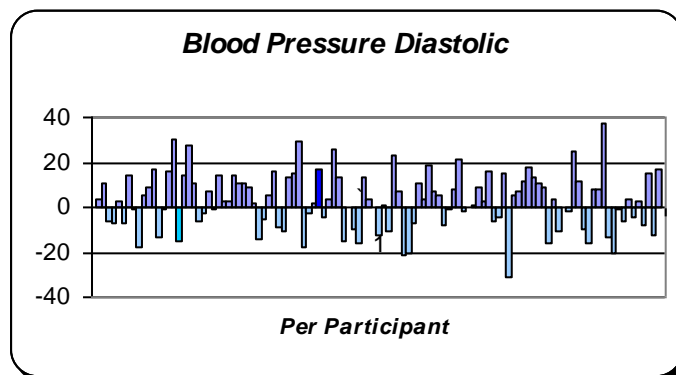


Table 6

Most research has shown that after a massage blood pressure had been reduced. However, the findings from this research did not produce the same results.

When firefighters are on-duty and in what is termed emergency stand-by mode (a state of readiness), the firefighter may not be in a truly relaxed state. When the fire department's emergency alerting system is activated, the employee's adrenalin levels spike thus causing their blood pressure to automatically increase. This constant up and down adrenalin rush is contributing to the inability of the firefighter to fully relax.

Life in the fire and emergency services is physically demanding. Your adrenalin can go from zero-to-60 in seconds; starting an emotional roller coaster that can reach some pretty dark lows. Heart attacks, stress-related diseases, alcoholism and divorce abound because 911 is supposed to handle all of the world's problems and disasters. (Wilmoth, 2001)

This type of adrenalin rush is contributing to the difference in research. However, it still must be stated that the results indicated in this study did not have a typical reduction of blood pressure compared to the general populace. Our employees indicated subjective stress reduction and an improved sense of well-being.

Another reason may be attributed to the fact that blood pressure reading(s) taken after the massage were taken after the employee had gotten dressed and was in a seated position. If the blood pressure reading(s) were taken while the employee was still supine the blood pressure reading(s) may have had a reduction. Orthostatic blood pressures normally have a reduction of blood pressure if the subject is lying down as compared to sitting or standing.

Therefore, the findings on blood pressure not consistently lowering after the massage may be due to the fact that firefighters are never able to fully relax, and the firefighter was not in

the supine position when the blood pressure was taken. Systolic blood pressure on average recorded a 2.76-mmHg increase.

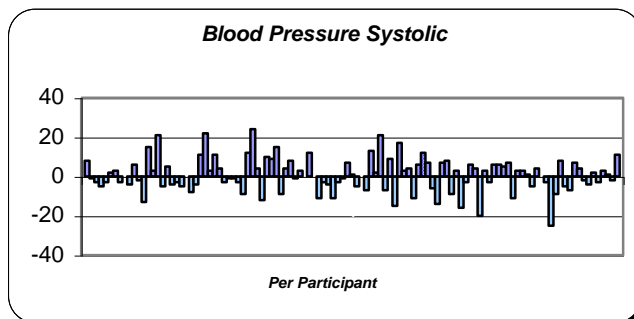


Table 7

Research question #4 was, “will massage therapy effect the pulse rate?” The pulse rate measured after the massage therapy session showed a considerable reduction. On average, there was a 5.47 beat per minute (BPM) decrease in the pulse rate of the firefighter. The objective data collected was an exceptional result in lowering the pulse rate of the firefighter.

The pulse rates were taken via the pulse oximetry machine that was used on all of the firefighters. The pulse rates were compiled by the massage therapist and tracked during each massage therapy session. The data was tabulated by the researcher and placed into graphs. The data was then placed in a spreadsheet to compile the statistics.

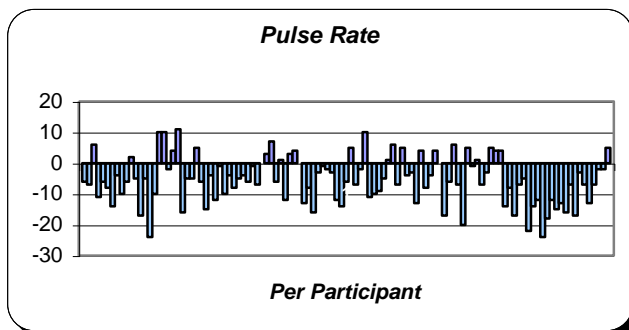


Table 8

Research question #5 was, “will massage therapy effect the oxygen saturation of the firefighter?” The oxygen saturation was taken prior to and after each massage therapy session. The results of this research proved that massage therapy did have an effect on oxygen saturation. Oxygen saturation was increased on average by 0.32%. This data proved that the periphery was oxygenated at an increased percentage of oxygen saturation. This data showed that the firefighter had better circulation and an increase in oxygen to the firefighter’s vital organs and periphery.

With this increase in oxygenation, the firefighter was able to reduce stiffness and/or pain in areas of the body that hold stress.

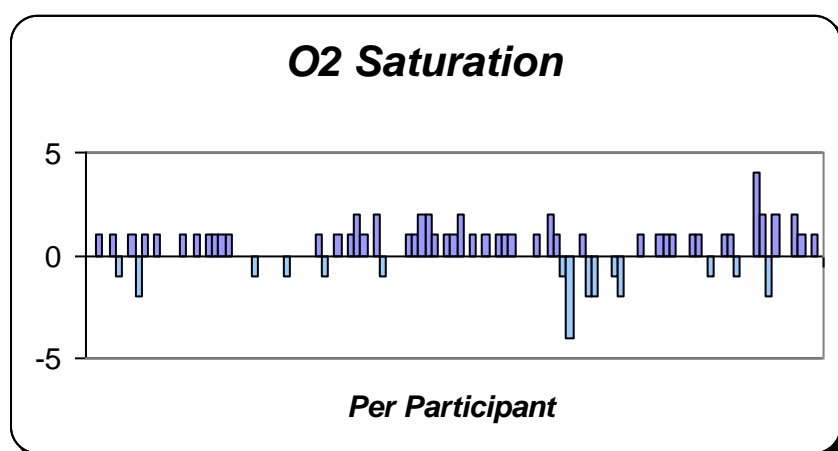


Table 9

The first questionnaire the employee was asked to complete was the Pre–Program Questionnaire. Although there were 31 participants, a total of 37 Pre–Program Questionnaires were filled out. Reasons for not participating by all the members of the department are unknown to this researcher at this time.

The City of Forest Park Fire Department employs 56 employees. We had 31 employees participate in this research resulting in a 55% participation rate.

The massage program was strictly voluntary and 55% participation is very acceptable. Making this mandatory would have resulted in contract issues and possibly a change in working conditions. Therefore, this research project remained voluntary. If this project were mandatory the data collected may have been skewed.

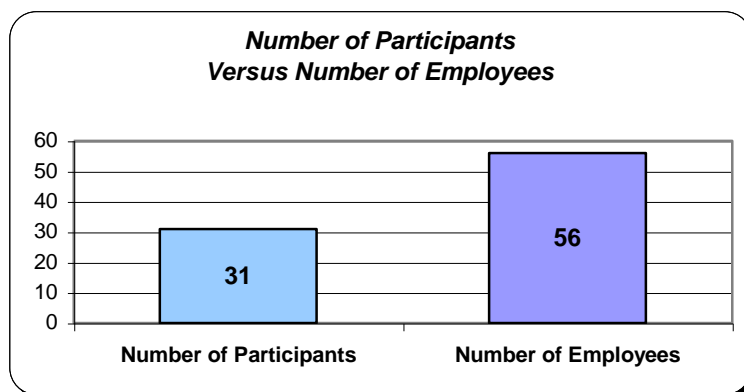


Table 10

The results of having been exposed to professional massage in the past were split almost evenly. For those who did not have a professional massage before, this was their first experience. Having massage conducted on the employee while on-duty was difficult for some to accept. Having a massage therapist conduct massage voluntarily was an issue that arose by some of the firefighters.

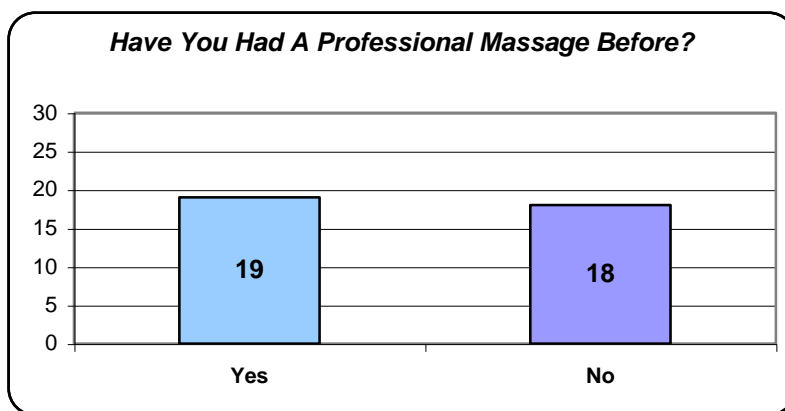


Table 11

Identifying the areas where stress is held in the firefighters body was a tool that was needed for site-specific massage therapy techniques. Knowing this information for the massage therapist was critical in helping the firefighter learn to relax. Relaxation for the firefighter can be impossible due to unplanned for emergency details.

The areas of the body identified such as muscle tension, tightness, back and neck pain are areas the massage therapist is able to focus on. Some of the other responses such as eating, sleeping and nervousness are areas the therapist was able to counsel the firefighter on and suggest techniques they may use to help alleviate this problem. (See Appendix 10)

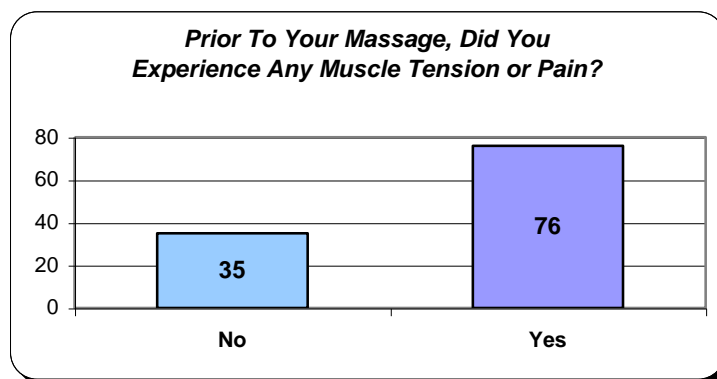


Table 12

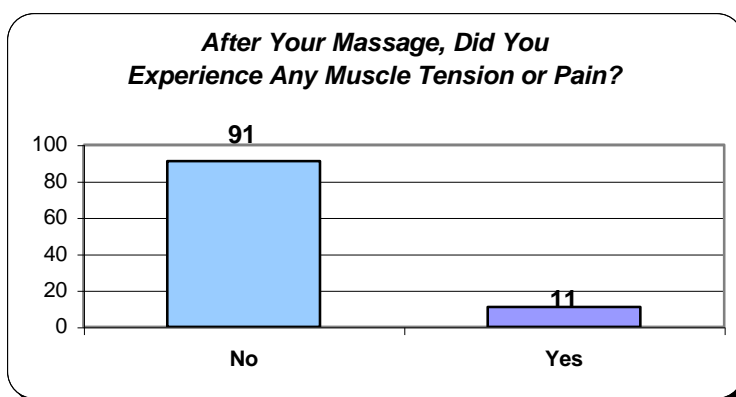


Table 13

It was important to discuss techniques with the participant on methods to alleviate and identify areas in the body that held stress. Also, if there were certain areas in the body that the massage therapist considered to be beneficial to the firefighter, these would be focused on during the massage therapy session.

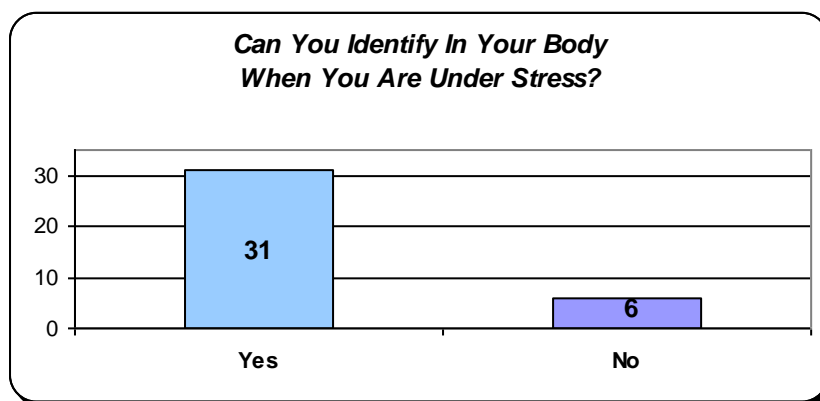


Table 14

Determining whether the participant was having headaches after the massage was important to the massage therapist. For those who had headaches, the massage therapist would track this in the health history to assure the headaches were not a result of the massage session.

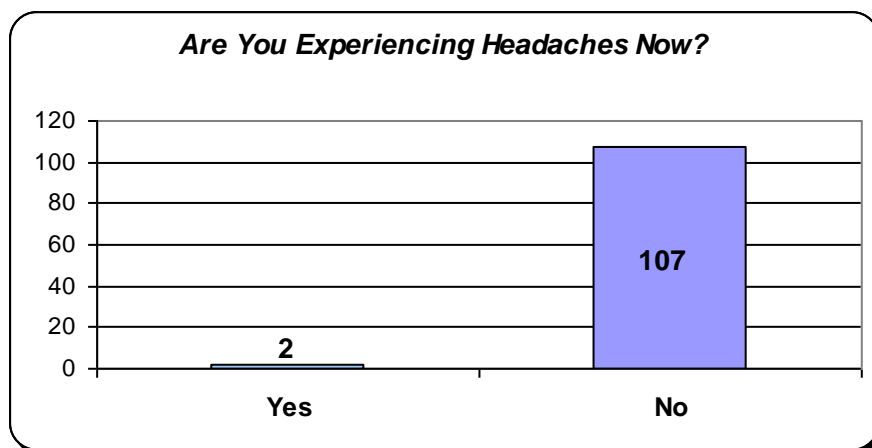


Table 15

Determining the effectiveness of the massage in addressing stiffness and tension was important to address. The areas in the body that are holding this stiffness and tension must be addressed. The result of only four participants having stiffness and tension after completion of massage therapy was an outstanding result in determining that the massage therapy session was advantageous in reducing stiffness and tension.

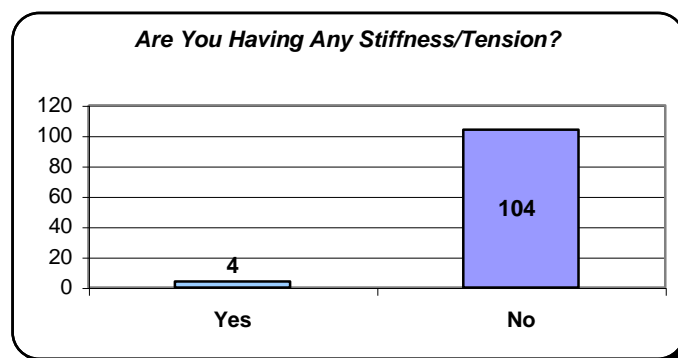


Table 16

Tracking the results of the massage from during to after the massage session was conducted subjectively. With only four participants indicating their perceived stress level after the massage raising from low to medium and the remaining participants stress levels were reduced is an exceptional result in determining that massage was effective in reducing the perceived stress level of the participant.

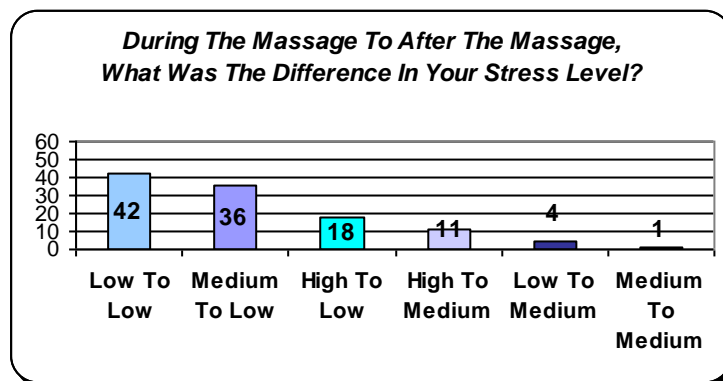


Table 17

The summary of the results of this research have proven both objectively and subjectively that massage therapy conducted on firefighters while on duty did result in a decrease in the amount of stress the firefighter has encountered.

The question asked to the firefighter, “Overall, was the massage a tool that reduced stress?” subjectively shows beyond any expectation that massage therapy has the ability to reduce the amount of stress understood by the firefighter.

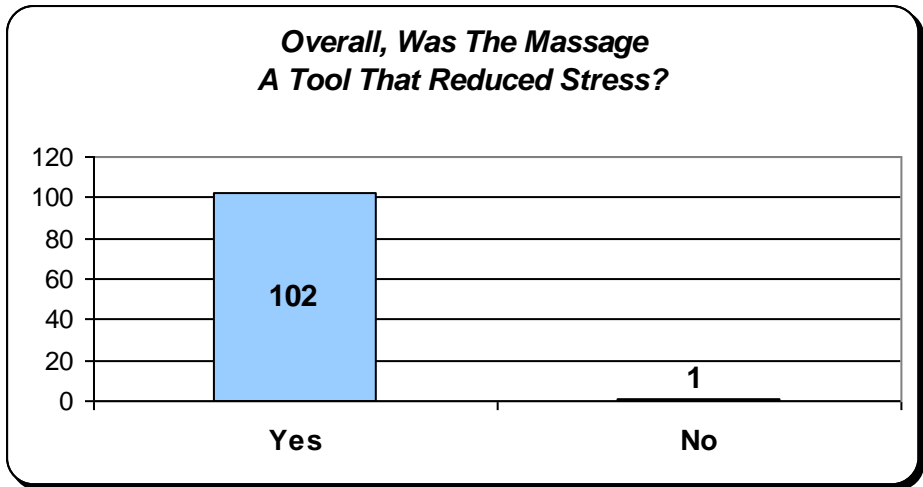


Table 18

DISCUSSION

Conclusions of this study and results are different than what was suggested by the literature review. Blood pressure was measured in several case studies. The case studies consistently showed a decrease in blood pressure after massage therapy.

In this study, *The Effects of Back Massage Before Diagnostic Cardiac Catheterization*, the patients who were scheduled for cardiac catheterization had their baseline vitals lowered after the massage. Systolic blood pressure was reduced a mean of 20-mmHg immediately after a 20-minute back massage and seven-mmHg, ten minutes after the 20-minute massage. (McNamara et al.)

As compared to this research on average a 0.72 mmHg increase in diastolic blood pressure was recorded. There was a 2.76 mmHg increase of systolic blood pressure. The researcher has determined that the different results are suggested by different techniques in blood pressure measurement.

When the participant came into the room the blood pressure was taken in the seated position and dressed. After the massage was completed the massage therapist left the room. The participant then got dressed and was seated. The blood pressure was taken in the seated position. The researcher believes if the blood pressure were taken while the participant was supine prior to getting dressed the results would have been different.

Fire department administrators must continue to research ways to reduce the number of line of duty deaths. With heart attacks a leading cause of death we must look for alternative ways to address this problem. Massage therapy is an area that will assist in lowering this number.

During firefighting activities, there's an even greater demand for increased blood flow since the firefighter is performing heavy muscular work and experiencing thermal strain, which increases the blood flow to the skin. However, blood flow is compromised during firefighting because stroke volume decreases. The situation that the cardiovascular system faces during firefighting can be likened to the situation firefighters would encounter if they went to a huge fire that needed maximal water flow only to find that the pumping capacity is maximized. What accounts for the decrease in stroke volume at the time that the pumping capacity should be maximized? There are two answers. First, sweating causes a decrease in blood volume. Specifically, it causes a decrease in plasma volume. In fact, when we subsequently measured changes in blood volume associated with firefighting, we found that 17 minutes of firefighting resulted in a 15% reduction in plasma volume. (Smith, 2001)

As discussed in the Results Section of this research, massage therapy can increase circulation to the periphery. Increased circulation can lower the time it takes muscles to recover from overexertion.

Strenuous activity will have an effect on firefighters' blood pressure. The main problem seen is when firefighters are in the emergency stand-by mode, basically waiting for an emergency detail to come in. When the emergency detail comes in the adrenalin in the body accelerates, thus causing the blood pressure to increase.

Therefore, these ups and downs of adrenalin can have an effect on firefighters' blood pressure. Every time the bell rings for an emergency detail the firefighter has a sudden increase in stress. Listening to the dispatch, routes of travel to the scene, any safety issues and, most

importantly, fire/EMS tactics on mitigating the emergency ultimately adds to the stress each firefighter faces once the alarm is sounded.

The pulse rate and oxygen saturation results are basically the same as what was researched. The pulse rate decrease, on average of 5.47 beats per minute, shows a more relaxed firefighter.

The oxygen saturation has a very small change of 0.32% increase. This measurement coincides with increased blood flow after the massage. Research has shown that blood flow increases after massage.

Massage Therapy is the manipulation of soft tissue for therapeutic purpose affecting all of the systems of the body, primarily the muscular, circulatory and nervous systems. It increases the blood supply and nutrients to the muscles without adding to their load of lactic acid. Therapeutic massage also has a tranquilizing effect on the central nervous system. (Dellinger, et al. 2003, p.1)

Here again, the effects of massage therapy on the firefighter will reduce the amount of stress the firefighter faces. The increase of blood supply is an integral area that has positive outcomes in reducing the stress on the firefighter.

Massage Therapy can give relief from chronic tightness in the neck and shoulders caused by stress, poor posture, and job-related repetitive motions. Massages focused on the lower back, can improve stiff aching muscles attributed to weak abdominal muscles, muscle strains and imbalances. Increased circulation provided by massage therapy will alleviate muscle cramps and nervous twitching in tired arms and legs. (Dellinger, et al. 2003, p.2)

The ultimate result is the subjective data that was identified. Of the 112 massages that were conducted, only five firefighters felt their stress level increased after the massage. 96% of the firefighters who participated in the program felt their stress level was lower. These results indicate that massage therapy in the fire service can be an effective tool that reduces stress. Another subjective piece of data that was compiled was of the 112 massages performed; there was only one participant who stated he/she did not feel that massage therapy was a tool that reduced stress.

With this type of overwhelming data proving that massage therapy was a tool that reduced stress the implications for the Forest Park Fire Department are:

Healthy employees are employees who provide the best possible service to our customers. Workers Compensation issues can be reduced. Health problems can be remedied. Therefore, the ultimate benefit is that the department's employees are able to meet the department's goal to have healthy, happy and productive employees.

More productive employees are essential to any organization. With increased productivity comes increased morale. Supervision is not constantly needed. Productivity of the firefighters allows firefighters to be empowered to provide the best service possible to the customer.

Happy employees are those employees who enjoy coming to work. There is little to be gained from an employee who is not happy. This causes problems within the service that the department is providing. When the department has happy employees, the employee can provide the highest service level possible.

Any decreased stress level of the employee matters. With less stress comes a decrease in lost work time due to illness or injury. Massage therapy has the potential to reduce the amount

of stress on the firefighter. When a firefighter's stress level is reduced, productivity and good customer care also is increased for both fire and EMS delivery.

It is recommended that massage therapy can be an additional avenue along with critical incident stress management (CISM) to address stress issues. At the present time, CISM is the only means that fire department administrators have to combat this problem. CISM is a good tool to use, however, it should not be the only tool. Massage therapy associated with CISM is an additional means to help the firefighter to reduce the amount of stress he/she faces.

Having a person who is on station to provide massage to employees on a regular basis is recommended. Knowing that a massage therapist is available to the fire department on a regular basis allows for time to discuss certain types of issues that effect a firefighter's stress level. Having the ability to discuss issues with someone other than a supervisor may also have positive outcomes.

RECOMMENDATIONS

With the results obtained by this research, the Forest Park Fire Department will continue to use massage therapy as a tool to reduce the amount of stress associated with the profession of firefighting. Overwhelming results of this study show that massage therapy did reduce stress on the firefighter within the Forest Park Fire Department. It is recommended that Forest Park Fire Department continue this program.

The program will continue to involve all three shifts that work the 24/48-hour work schedule. The massage therapist will come to the fire department every Wednesday, Thursday and Friday from 9:00 am until 4:00 pm. All firefighters will be permitted to schedule one-half hour massage therapy sessions while on duty.

The massage therapist, Mary Lou Knapke S.C., L.M.T., will continue to provide this service for the Forest Park Fire Department. At the present time there are no funds available to pay the massage therapist. The massage therapist is providing this service on a volunteer basis.

The program will continue to be voluntary. Participation in this research has been solely voluntary for all Forest Park Fire Department members.

It may take years of research to determine the overall impact massage therapy will have on this department. The trend data may be sent to JEMS or other magazines for publication. At the present time findings from this research have been accepted at the International Crisis Incident Stress Foundation's Eighth World Workshop Congress on Stress, Trauma and Coping Crisis Intervention: Best Practices in Prevention, Preparedness and Response February 16-20, 2005 in Baltimore, MD. The researcher anticipates nominal interest in massage therapy for firefighters throughout the United States at this time.

It is recommended to institute the After-Care Crisis Response Team along with CISM Teams. This team will assist with CISM callouts. The response team will have to complete the training that is required including a 30-hour orientation to introduce the massage therapist into the fire department culture. During these 30- hours, the massage therapist will be able to observe the life of the firefighter and go on emergency details to observe. Under no circumstances will the massage therapist be involved with any patient care or firefighting activities. Their only purpose will be to observe the firefighters during routine details.

Once the massage therapist completes this training program, the team will begin to search for other departments who may want to participate in this program. The massage therapist will then be assigned to other department(s) to assist with stress reduction in said department(s).

It is recommended to provide massage therapy to newly hired firefighters who have little or no cumulative stress from high stress incidents, tracking blood pressure changes especially.

Blood pressure readings should be taken while the participant is still lying on a massage therapy table. During this research, blood pressure was taken after the participant was off the table, dressed and seated. All blood pressure readings should be taken while the firefighter is lying supine before and after each massage to determine the difference in blood pressure, pulse rate and oxygenation.

Provide one-half hour massage therapy session in the same room for the duration of research time. During this research study, the Forest Park Fire Department had a major construction project to contend with, which meant that the location of the massage session was constantly subject to change.

It is recommended that the specific kinds of emergency details that interrupt the massage therapy sessions be studied. During this research there were sixteen-massage therapy sessions

interrupted by emergency details. The types of details were not studied. Studying the details may ascertain what type of emergencies effect the stress level of the firefighter compared to those types of emergency details that have little or no effect.

It is recommended that reasons for non-participation from those who did not receive massage be studied. Since this program was voluntarily administered finding out reasons for non-participation was not an issue, however, knowing reasons for non-participation may assist with other departments in getting a higher number of firefighters to participate in this program.

Compare/contrast study results utilizing the same methodology for departments with lower call volumes. Since Forest Park Fire Department averages approximately ten emergency details per day this may provide a good baseline for a moderately busy fire department. For those that only average one to five emergency details a day making time for massage therapy may be easier.

Compare/contrast impact of massage therapy by striating study population by age and length of time in the fire service. By studying the age differences between young firefighters between the ages of twenty to twenty-five years old may have other outcomes within this research.

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APPENDIX 1 – HEALTH HISTORY

CONFIDENTIAL HEALTH HISTORY

FOREST PARK FIRE DEPARTMENT MASSAGE PROJECT

Massage Ministries

Mary Lou Knapke, S.C., L.M.T.

2420 Drex Avenue, Suite 201

Cincinnati, OH 45212

Name: _____ Date of Birth: _____

Address: _____ City: _____ State: _____

Occupation: _____

Phone #'s: Home: _____ Work: _____ Cell: _____

Family Physician: _____ Phone #: _____

Have you had a professional massage before this one? Yes _____ No _____

Where do you usually hold stress in your body? _____

MEDICAL AND SURGICAL HISTORY:

X = Current Conditions P = Past Conditions

F = Family History of Illness

___ Fever

___ Kidney Condition

___ Cancer: Type: _____

Location: _____

___ Allergies: To what? _____

Are you currently pregnant? _____

What Trimester? _____

___ Blood Pressure: _____ High _____ Low

With Medication: _____

___ Diabetes: Treatment _____

Thyroid: ___ Hyper ___ Hypo

Medication: _____

___ Arthritis ___ Rheumatoid ___ Osteo

___ Gout

___ Asthma/Lung Conditions

___ Pneumonia

___ Bronchitis

___ Emphysema

___ Spinal/Vertebral Injury

Dates and Locations: _____

___ Back Pain:

Location: _____

___ Numbness/Tingling

Location: _____

Have x-rays been taken? _____

Neck pain:

Location: _____

___ Neck Injury/Trauma:

Headaches: Location: _____

___ Migraines:

Frequency: _____

___ Head/Face Injuries

Type: _____

___ Childhood Serious Illnesses/Injuries

Dates: _____

___ Chronic Pain:

Location: _____

- Broken Bones: Location and Dates: _____
 Tendonitis
 Surgeries: _____ Dates: _____
 Cysts/Tumors
 Fatigue
 Heart Problems
 Depression
 Tension/Stress
 Chicken Pox/Shingles
 Sleep Disorders
 Hepatitis: Type _____
 Cold Sores
 Tuberculosis
 Use of blood thinners
 Anemia
 Bruise Easily
 Stroke: Location and date: _____
 Ulcers
 Abdominal/Digestive Problems
 Constipation
 Diarrhea
 Hernia
 Water Retention
 Varicose Veins: Location: _____
 Epilepsy
 Contagious Skin
 Contagious Illness: Type _____
 Anxiety
 Infections
 Inflammations
 Blood Clots/Arterial Blockage Location: _____
 Vision Problems
 Rash/Foot Fungus
 Hearing Problems
 Sinus Problems
 Dental: Bridges/Braces
 Jaw Pain, TMJ
 Other Medical Conditions not listed _____
 Pelvic Pain

List current medications you are taking (include aspirin, ibuprofen, herbs, vitamins, etc.)

I understand that the massage therapy given here is for the purpose of stress reduction and relief from muscular tension.

I understand the massage therapist does not diagnose illness, disease or any physical or mental disorder. The massage therapist cannot prescribe medical treatment or pharmaceuticals and will not perform spinal manipulations.

I understand and have signed the HIPPA form.

Client's Signature: _____

Therapist's Signature: _____
Mary Lou Knapke, S.C., L.M.T.
Licensed Massage Therapist

Date: _____

APPENDIX 2 – EMPLOYEE PRE-PROGRAM QUESTIONNAIRE:

EMPLOYEE NUMBER: _____

DATE: _____

1. When I first heard about the massage project I _____

2. Comments I heard around the firehouse about the program _____

3. One reason I decided to participate in the program is _____

4. Generally my attitude about massage is _____

5. Currently what do I do about stress relief? _____

6. Have you had a professional massage before? Yes or No
7. Can you identify in your body when you are under stress Yes or No if yes define how. _____

8. Are you currently on an exercise program? Yes or No If yes what type aerobic, strength or other, define other _____

APPENDIX 3 – EMPLOYEE POST-MASSAGE QUESTIONNAIRE

EMPLOYEE NUMBER: _____

DATE: _____

SESSION NUMBER: _____

BLOOD PRESSURE PRE: _____

BLOOD PRESSURE POST: _____

PULSE PRE: _____

PULSE POST: _____

OXYGEN SATURATION PRE: _____

OXYGEN SATURATION POST: _____

LOW

MEDIUM

HIGH

YES

NO

Please fill out the following

1. Prior to your massage did you experience muscle tension or pain? _____
2. After your massage did you experience any muscle tension or pain? _____
3. During the massage what was your stress level? _____
4. After the massage what was your stress level? _____
5. Before this massage I have handled _____ number of emergency details.
6. Was the massage interrupted by an emergency detail? Yes or No

7. If the massage was interrupted by an emergency detail, did you feel your stress level was reduced after returning from the detail? Yes or No
8. Overall was the massage a tool that reduced stress? Yes or No
9. Are you experiencing headaches now? Yes or No
10. Are you having any stiffness/tension? Yes or No
11. Was your blood pressure lower after the massage? Yes or No

APPENDIX 4 – The following is a sampling of responses to the Pre–Program

Questionnaire that was filled out by the employees who participated: When I first heard about the massage project I _____:

- Didn't think I would have an opportunity to partake"
- "Was interested because I have had several; the experiences were excellent. I was a little hesitant due to the title of the therapist (Sister)"
- "Happy to participate and heard nothing but positive feedback"
- "Thought it was a good idea"
- "Was enlightened to see that someone is interested in decreasing stress instead of adding"
- "Thought it would be nice to get a massage on a regular basis"
- "Wanted to get a massage to relieve tension in my back"
- "Was concerned about confidentiality"
- "Was curious"
- "A colleague said to sign up so I gave it a shot"
- "Was not in a bar surrounded by scantily-clad women, but it still sounded interesting, workable, and a logical solution"
- "Curious on what would be accomplished, sounds like a good stress reducer"
- "Was apprehensive and felt a little uncomfortable"
- "Decided to take full advantage of the benefits of the program"
- "Was skeptical. I am very possessive of my personal space and didn't know if I could get past my possessiveness—but I'm willing to try"
- "Became interested in its potential"

- “Didn’t know what to expect, never had one, thought it would be cool, then wondered what was the catch”
- “Was very interested and believed it would help guys here at the fire house”
- “Was skeptical but enthusiastic”
- “Was intrigued at the prospect”
- “Was excited, I had some exposure to massage, and I am interested in learning more”
- “Did not know what it was about”
- “Was excited, I felt it is a good idea, much needed and will be a very successful project”
“Didn’t have any feelings about it.”

APPENDIX 5 – Comments I heard around the firehouse about the program _____:

- “That is was relaxing”
- “? A nun? What’s up with that?–Dude I’m going straight to hell for that thought! Etc.”
- “Were good and some were made in comical tones, but most were interested on the effect it might have on stress levels”
- “People were originally curious with few negative comments”
- “A very good program very relaxing”
- “Relieves stress”
- “I don’t feed the rumor mill! O.K. other than mild joking, it was all positive reaction”
- “Nervous about a “Sister” doing the massage”
- “Were overall positive”
- “Should participate–excellent program”
- “Various; all positive”
- “No specific comments but a mixture of feelings–excitement, eagerness, anticipation”
- “This is crazy!”
- “Felt funny having a sister give them massage”
- “It seemed as though most people were excited and interested in it”
- “A little reluctance/but anticipating the project”
- “Were mostly positive, some confusion as to what would be transpiring”
- “Mixed reactions”
- “Free and good, join”
- “Some people were uncomfortable about it”

APPENDIX 6 – One reason I decided to participate in the program is _____:

- “Available time”
- “Relaxation, stress management”
- “A good experience”
- “Generally good attitude about programs”
- “Seems relaxing”
- “I do recognize that this is a high stress job and I have experienced a massage before and it did relieve my stress”
- “To relieve tension”
- “Self indulgent”
- “To satisfy curiosity”
- “Stressed about work, bills”
- “Probable mutual benefits to all participants”
- “To reduce stress and help Mike in his project”
- “I had one before and know the benefits”
- “Back pain”
- “I feel more comfortable and at ease with Sister May Lou”
- “I am interested in its therapeutic effects”
- “To take advantage of the stress reducing benefits”
- “I wanted to try and get over my personal space issue and be a part of a learning experience”
- “Most everyone else is”

- “Trying to get a handle on getting into better shape”
- “Enjoy helping someone’s program and maybe I can benefit”
- “Help better everybody’s health”
- “To see if it will help my stress”
- “Massage is good”
- “That it is important and that I believe there will be a difference”
- “The desire to learn more about massage”
- “Sounded interesting”
- “Sounds great encouraged to join by fellow firefighters”
- “The whole unit is participating”
- “Heard it was a very good stress reliever”

APPENDIX 7 – Generally my attitude about massage is _____:

- “Indecisive”
- “Healthy! Healthy! Healthy! Very relaxing”
- “I like them”
- “Great”
- “It would be nice to get massages on a regular basis but I can’t afford them”
- “Great, massages relieve a great deal of tension”
- “Open”
- “Neutral”
- “Relaxing”
- “I’ll get it done when I have time and money to spare”
- “It’s a wonderful tool to relieve stress”
- “Helpful”
- “Very Open”
- “They’re OK for me”
- “Skeptical”
- “It works! It can be used as recreation; stress relief, etc., I’m pro massage”
- “It is very beneficial—both mentally and physically”
- “Scared”
- “I’m OK with it”
- “Funny”
- “That it is a good alternative solution for stress relief”

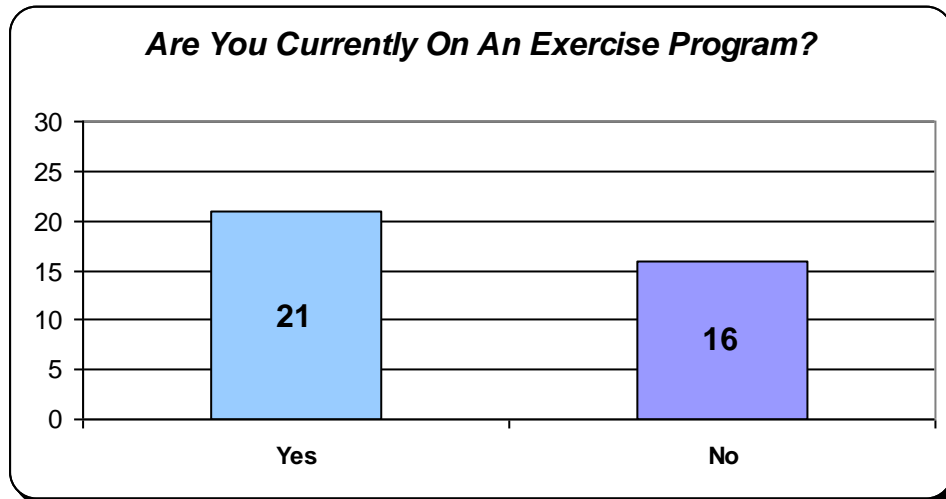
- “Very positive I believe in the power of touch”
- “Promotes good well-being/health”

APPENDIX 8 – Currently what do I do about stress relief _____?:

- “Play sports”
- “Eat–debate–work (occupy myself at work)”
- “Meditate”
- “Nothing”
- “Don’t have time to do anything about it now”
- “I don’t do enough to relieve stress”
- “Spend time with friends and family socially”
- “Exercise”
- “Try to think of positive things”
- “I used to run, bicycle, lift weights and drain bourbon bottles. Lately I work in the garage on household projects”
- “Drink beer”
- “Lie down, rest”
- “Work out, play with my child, get a massage”
- “I load my own ammunition and target shoot regularly. I also watch airlines and enjoy auto racing”
- “I chill out by being alone for personal reflection”
- “Pass it off as a joke”
- “Garden”
- “Ride motorcycle”
- “Workout–read”

- “Not much”
- “Little to nothing”
- “Relax with family, talk with others”
- “Medications sometime, meditate mostly–time alone”
- “Smoke”
- “Ignore it”
- “Try to reduce it myself through relaxing music, atmosphere, and environment”
- “Hot baths, pedicures, professional massage when I have the money, hot packs, naps”
- “Run”

APPENDIX 9 - Are you currently on an exercise program? If yes, what type aerobic, strength, or other, define other _____:



- “Aerobic and strength”
- “Strength”
- “Just the see food diet”
- “No structured activity–just walking, biking and karate”
- “Trying to do body for life program”
- “Occasional gym use no routine”
- “Running, walking, yoga, pilates”
- “Cardio, kickboxing, walking, cycling, yoga, pilates, also strength”
- “Workout on my own three times a week, play soccer and softball weekly, occasionally golf”

APPENDIX 10 - Can you identify in your body when you are under stress? If yes, define how.

- “Sleep a lot but not tired”
- “I tend not to eat when I shouldn’t and eat the wrong things (unhealthy)”
- “Muscle tension”
- “Tightness in the neck and shoulders”
- “Neck and back pain”
- “I think part of it is when I feel tired with no energy”
- “Shoulders and neck pain/tightness”
- “Upper body”
- “General over all tension”
- “I just get uptight”
- “Headaches”
- “Tightness in the neck and back–lack of tolerance for others and headache”
- “My forehead tenses up”
- “I can feel the tension in my shoulders and neck. The tension also manifests itself in my temples and parietal regions as a severe squeezing pain”
- “I can’t sleep”
- “Tension”
- “All over body”
- “Rapid heart rate, anxious”
- “I get headaches and pain in between my shoulders–I also tend to have an attitude at times”

- “I clench my jaw terribly”
- “Pressure, tension”
- “Neck/shoulder tightness”
- “Tension in shoulders and lower back, anxiety attacks”
- “There tends to be a build up of tension in my upper and lower back during time of stress”
- “I feel my shoulders tense up, lower back pain, stiff neck”
- “Nervousness, muscle tension, anxiety and migraines”
- “Nervousness”