

A.L. Day<sup>1</sup>, L. Gillan<sup>1</sup>, L. Francis<sup>1</sup>, E.K. Kelloway<sup>1</sup>, M. Natarajan<sup>2</sup>

## Massage therapy in the workplace: Reducing employee strain and blood pressure

<sup>1</sup> Dept of Psychology, Saint Mary's University

<sup>2</sup> ICT Northumberland College

**ABSTRACT.** *AIM: Assess the effects of workplace-based massage therapy on physiological and psychological outcomes. METHODS: We used a field experiment in which 28 participants were randomly assigned into either an experimental (n=14) or control (n=14) group. The experimental group received weekly massage treatments at work for a four week period while the control group did not. RESULTS: Both strain and blood pressure were significantly reduced during treatment for the experimental group but not for the control group. CONCLUSIONS: This study provides initial support for the effectiveness of workplace-based massage therapy as part of a comprehensive workplace health strategy.*

**Key words:** *workplace, massage, comprehensive health strategy.*

**RIASSUNTO. OBIETTIVI:** Valutare l'esito nelle misure fisiologiche e psicologiche della terapia di massaggio effettuata sul luogo di lavoro.

**METODI:** Sono stati reclutati ventotto partecipanti, allocati in modo randomizzato in un gruppo sperimentale (n=14) e in uno di controllo (n=14). I soggetti del gruppo sperimentale hanno ricevuto un massaggio sul luogo di lavoro con frequenza settimanale per quattro settimane.

**RISULTATI:** Sia lo strain che la pressione arteriosa hanno mostrato una diminuzione significativa nel gruppo trattato e non nel gruppo controllo.

**CONCLUSIONI:** Lo studio fornisce un primo supporto di efficacia al massaggio effettuato sul luogo di lavoro come parte di una strategia atta a sostenere la salute nel luogo di lavoro.

**Parole chiave:** lavoro, massaggio, strategia multidisciplinari orientate alla salute.

### Introduction

In recent years, the study of stress has become widespread, with individuals in many health-related professions and social science fields showing increased concern for the subject and its impact on the overall population at large (1). Leaders in business and industry have recognized the need to reduce organizational stressors. Despite organizational efforts to achieve this goal, employees still experience stress and strain at work. Therefore, some organizations are beginning to provide services to help employees cope with and alleviate stress and strain (1). Studies have found that massage therapy is effective in alleviating psychological and physiological strain, as made evident by reduced blood pressure, decreased urinary and salivary cortisol levels, and lowered catecholamine levels as well as through decreases in self-reported perceived stress (2-5). Work-site massage therapy offered to employees may offer additional benefits in terms of increased positive employee outcomes related to both physical and psychological health, as well as increased employee productivity and job satisfaction (4). Massage therapy treatment may also be effective in reducing negative psychological, physiological, and behavioural strain symptoms, and could therefore be employed as a strain reduction strategy directly within organizations. Few studies, however, have systematically examined the effectiveness of massage therapy at work. Therefore, the purpose of the present study was to investigate the effects of worksite massage therapy treatment on employees' physiological and psychological health.

### Stress, Stressors, and Strain

Occupational stress is defined as "the cumulative pressures in the workplace that can cause psychophysiological symptoms and vulnerabilities to work injuries and disease" (6). Stressors are concrete situations or factors that have the potential to create strain in an individual (7) if the individual perceives the situation or factor to be stressful. That is, perceived stress reflects the extent to which an individual experiences a stressor "as taxing or exceeding his or her resources and endangering well-being" (8). Thus, stress is a subjective state of appraising concrete and ob-

jective stressors in the environment as being negative or a threat (9). Perceived stress then may result in physical, psychological, or behavioural strain. This interactional approach to stress stipulates that situational variables (stressors) interact with personal variables (subjective appraisal and coping) to cause strain (10). That is, strain does not always result from stress. Because stressors will be perceived differently among individuals as being more or less stressful, individual strain outcomes also will differ (11). Research highlights the importance of both individuals' subjective perception of the environment as being 'stressful', and their available coping resources in determining health outcomes and the manifestation of strain symptoms. Moreover, these strain symptoms may then create, or be perceived as, other stressors, thus creating a cyclical pattern of stress.

Cumulative stressors in the workplace are a significant contributing factor to a multitude of health problems in employees, and can manifest themselves in a variety of ways (10, 6, 12). Although some individuals may present psychophysiological strain symptoms, other individuals may display psychological distress, lowered productivity, an increased vulnerability to work injury, a range of acute or chronic health conditions, or a general increased susceptibility to illness or disease (10, 6, 12). Some physiological strain outcomes of ongoing workplace stress include an increase in the symptoms of musculoskeletal disorders, back pain, headaches, blood pressure, heart rate, and fatigue (13, 3, 6), which can ultimately translate into worker absence and sick leave. According to Field (14), lower back pain is one of the most frequent causes of absenteeism and worker's compensation claims. Ongoing stress is also a leading risk factor in heart disease, stroke, arthritis, and duodenal ulcers, and can significantly increase an individual's overall susceptibility to disease and injury (13, 3, 6).

Employee stress is also associated with a host of negative psychological strain outcomes, such as employee burnout, increased anxiety and depression, and decreased cognitive functioning (15, 16). Research has also shown that workplace strain can be detrimental to employee behaviour, leading to low motivation and morale, decreased work performance, job satisfaction and productivity, and increased absenteeism and workplace accidents (15, 16, 6). Stress and strain can also interfere with career goals and goal setting (6). It is evident that workplace stress and employee strain carry a significant health cost to employees as well as a financial cost to organizations.

The manner in which individuals respond to stressors and perceived stress can impact their level of strain. Folkman and Lazarus (11) distinguished between problem-focused coping, where individuals deal directly with the problem causing distress, and emotion-focused coping, whereby individuals regulate their emotional response to stressful situations. Individual difference variables are an integral part of coping with stress (11). Thus, massage therapy may facilitate emotion-focused coping by influencing personal variables such as anxiety levels and blood pressure, or improved sleep and relaxation.

### **Massage Therapy**

Massage therapy is defined as "the manipulation of soft tissue by trained therapists for therapeutic purposes" (14) and tends to "bring about generalized improvements in health, such as relaxation or improved sleep, or specific physical benefits, such as relief of muscular aches and pains" (17). Massage therapy is one of the oldest forms of treatment in the world, and a developed practice of therapeutic massage exists in almost all cultures (17). Massage therapy, however, began to dissipate from the American medical scene at approximately the time of the medical model and the pharmaceutical revolution of the 1940's (14). Typically, massage therapy consists of a client receiving massage treatment on a specially designed massage table. This process can be adapted to the constraints of a more conventional setting by limiting work to the hands, head, neck, or shoulders in a seated massage (17).

### **Physiological benefits of massage therapy**

Several studies have found that massage is effective in alleviating strain symptoms, in terms of lowered blood pressure, decreased urinary and salivary cortisol levels, lowered catecholamine levels, and self-report assessments of decreased perceived stress (2-5). Because individuals vary in their ability to cope with stress, and ultimately in their vulnerability to injury or disease, and because massage therapy can decrease symptoms of stress, massage therapy may be highly beneficial to individual coping responses, and help improve overall health and well-being. Additionally, massage therapy that is offered and conducted directly in the workplace may be beneficial in alleviating occupational strain specifically.

Several studies have provided evidence for physiological benefits resulting from massage therapy treatment, such as the alleviation and symptom control of migraine and tension headaches, which are a leading cause of worker absenteeism (14, 5, 18, 19). In one study, participants were randomly assigned to either a massage therapy treatment group or a control group who received migraine medication. (18) Relative to the control group, the massage group reported a decrease in headache pain, had fewer headaches weekly, found improved and uninterrupted sleep, and increased serotonin levels (18). A related study (19) examined massage therapy treatment administered to sufferers of chronic tension headaches for four weeks following a four-week baseline period. Treatment was directed toward the neck and shoulders and was effective in reducing the number of chronic tension headaches per week in sufferers (19). Compared with baseline levels, headache frequency was significantly reduced within 1 week of massage therapy and was maintained during the 4 weeks of the treatment period. However, the sample size was very small (n=4) and results were based on diary data and a visual analogue scale (19).

Several studies have indicated a significant reduction in high blood pressure and associated symptoms through massage therapy treatments (20, 14, 3). For example, a seated 30-minute massage once per week significantly decreased sitting diastolic blood pressure after the first and last massage therapy sessions (3). Similarly, a 15-minute

seated massage sessions at work reduced both systolic and diastolic blood pressure in employees (20).

Massage therapy can also increase immune function. In one experimental study (21), two subjects received a massage therapy treatment during the experimental phase and no massage during the baseline phase while assays were conducted on lymphocyte proliferation (T and B lymphocytes), immunoglobins, and cortisol levels. There was a consistent and significant trend of increased activity of both lymphocytes and levels of serum for both subjects during the treatment phase compared to the control phase. Although a more robust study design and larger sample size are required, the preliminary findings present a basis for further study. Immune disorders would also be expected to benefit from massage therapy treatment due to lowered cortisol and catecholamine levels noted in several studies (2, 3, 21, 5). Ironson, Field, Scafidi, and Hashimoto (22) found increased cytotoxic capacity (Natural Killer Cell cytotoxicity and counts) in HIV positive adults after one month of daily 45-minute massage therapy treatments. Similarly, improved immunological functioning was detected in breast cancer patients as indicated by increased Natural Killer Cell counts and an increase in lymphocyte markers after the women received massage therapy treatments three times per week for five weeks, compared to measures in the control group (18). These studies support the existence of increased immunological functioning after consistent massage therapy treatment, which provides further implications for the alternative therapy, particularly for employees dealing with workplace stress.

A meta-analytic review (14) of the therapeutic effects of massage therapy found that this treatment was consistently associated with reduced pain across a variety of conditions including child birth, recovery from burns (when massage therapy was used prior to debridement), and following surgery, as well as among those with chronic pain conditions, such as juvenile rheumatoid arthritis and fibromyalgia (14). Furthermore, massage therapy facilitated growth in preterm infants (including cocaine-exposed and HIV-exposed infants) in the neonatal intensive care unit. Those infants who received 15 minutes of massage treatment three times per day for 10 days, while they were still in the incubator, gained more weight and were hospitalized for significantly less time (14).

### **Psychological benefits of massage therapy**

In addition to the noted physiological benefits, recent studies in massage therapy treatment also report encouraging results with regard to psychological strain symptoms, such as a reduction in depressive symptoms (23) and decreased anxiety levels (2). Similarly, massage treatment improves mood and well-being states (4), increases alertness, and enhances cognitive and work performance (24, 4). For example, after healthy adults received a 10-minute seated massage therapy session, anxiety scores decreased for all participants across three massage therapy conditions (moderate pressure massage therapy, light pressure massage therapy and vibrator massage; 2). Moreover, the moderate pressure massage group also experienced a de-

crease in heart rate and EEG changes including an increase in delta and a decrease in alpha activity, suggesting a relaxation response. This group also showed increased positive affect, as indicated by a shift toward left frontal EEG activation (2). Other studies using EEG activity as a primary outcome measure yielded similar results (24, 23). Following 15 minute massage therapy treatments, EEG patterns indicated increased relaxation and alertness and decreased right frontal lobe activity, a positive outcome given that right frontal lobe activity is related to negative mood and may also be a marker for depression (24, 25).

Other studies illustrate the psychological benefits of massage treatment in clinical populations. For example, adults with multiple sclerosis who were randomly assigned to receive two 45-minute massages per week for five weeks (treatment group) reported several gains relative to similar patients who received only regular medical treatment (control group; 18). The massage therapy group reported improved mood, lowered anxiety, reduced hostility levels, decreased urinary and salivary cortisol levels, and improved disease progression ratings, and enhanced social functioning status (3).

The effectiveness of massage therapy as a method of psychological and physiological symptom control in cancer patients was examined at a major U.S. cancer centre (26). Over a three-year period over 1,200 patients were treated. Patients reported pre- and post-massage therapy treatment symptom severity using 0-10 rating scale for pain, fatigue, stress/anxiety and depression. (26). Post-massage symptom scores were reduced by approximately 50%, even for patients reporting high baseline scores, and significant reductions were found in measures of anxiety, depression, and fatigue (26).

Aggressive adolescents assigned to a massage therapy intervention benefited from massage treatment showing reduced anxiety post-treatment and reduced hostility post treatment. Such differences were not reported among a control group who underwent a relaxation exercise rather than massage (27). Adolescent psychiatric patients also benefited from 30-minute massage treatments given on 5 consecutive days (28), reporting decreased anxiety levels, less frequent depressed mood, and improved sleep. Furthermore, nurses rated these patients as more cooperative on the final day of the study (28).

### **Massage Therapy and Work**

Stress in the workplace often leads to employee strain and can negatively impact employee health and well-being (15). These detrimental health effects can increase employee absenteeism and reduce productivity (29). Existing research suggests that work-site massage is a promising technique in the alleviation to work-related stress and strain. For example, employees who received 20-minutes of seated massage twice weekly for 8 weeks showed decreased anxiety levels, fewer sleep disturbances, and improved blood pressure and heart rate (4). Furthermore, their cognition scores and overall health ratings improved (4). In a similar study, employees' systolic and diastolic blood pressure decreased following a 6 week run of 15-minute, on-site seated massages delivered once per week (20).

Massage therapy may reduce strain symptoms and it may positively affect employee health and well-being. However, few studies have systematically examined the effectiveness of massage therapy in improving employee outcomes. For instance, the studies described above are limited by the lack of a control group. Therefore, using both treatment and control groups, we examined whether massage therapy decreases employee strain and blood pressure and improves perceived well-being. Participants in the treatment group received weekly massage treatments for four weeks. The following hypotheses were tested:

*Hypothesis 1: Massage therapy will decrease employees' perceived strain over the four-week treatment period.*

*Hypothesis 2: Massage therapy will significantly decrease systolic and diastolic blood pressure levels in the treatment group across the four treatment sessions.*

*Hypothesis 3: Massage therapy will decrease both systolic and diastolic blood pressure within the same session (pre- and post-treatment).*

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## Method

### Participants

Twenty-eight employees (26 women and 2 men, mean age = 39 years, SD = 9.5) from a government office based in eastern Canada volunteered to participate. All participants gave written, informed consent prior to entering the study. All participants were English-speaking, Caucasian, and all but 2 participants had completed some form of post-secondary education.

### Procedure

The 28 participants were randomly assigned into one of two groups of 14 people. The first group received treatment during the 4-week phase and the second group served as the control group. During the four control sessions, participants had their blood pressure measured and they completed the questionnaire.

During the four treatment sessions, participants had their baseline blood pressure measured and then received a 20-minute seated chair massage. For the duration of the massage treatment, participants were seated around a boardroom table, leaned forward at the hip with their head and arms on a pillow and received massage treatment to the back, neck, head, arms, wrists, and hands. The lights were dimmed while participants received treatment to encourage relaxation. Seven massage therapy students from a local, professional massage therapy school provided the massages each week under the guidance of massage therapy professors. The massage was conducted according to the following protocol. Long moderate pressure strokes were applied to back muscles, parallel to the spine. Gentle rocking and squeezing was applied to the shoulders and arms. Finger and thumb pressure was applied inferiorly along the spine. Circular palm kneading was performed at the hips. Massage to the arms consisted of kneading and

compressions beginning at the shoulders and moving distally to the wrist. Massage to the hands included fascial spreading, gentle finger distractions and thumb kneading to the palms. Gentle tractioning was applied at the shoulder and elbow. Massage to the neck consisted of kneading, squeezing and compressions beginning laterally at the shoulder and moving medially along the trapezius to the posterior cervical spine. Gentle finger pressure was applied to the skull and neck and massage applied to the scalp. The treatment concluded with gentle compressions and muscle squeezing from the trapezius, distally to the arms and light fingertip stroking along the entire back. Blood pressure was measured again after the massage treatment, and participants completed a questionnaire.

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## Measures

**Demographic information.** Respondents indicated their age, gender, education, and work history.

**Strain.** The 20-item Bartone Strain Scale (30) was used to assess psychological and physical strain symptoms. This scale rates the frequency which participants experienced health complaints over the previous week (eg., 'trouble sleeping', 'general aches and pains', 'loss of interest in things' or 'nervousness or tenseness'). The Bartone Strain Scale uses a 5-point Likert-type scale ranging from 'Never' (0) to 'Always' (5). Bartone et al. (30) reported that the scale demonstrated high internal reliability: The alphas in their original study were  $\alpha = .90$  at Time 1 and  $\alpha = .93$  at Time 2. In the present study, the coefficient alpha was calculated for each of the 4 weeks and ranged from  $\alpha = .73$  to  $\alpha = .83$ .

**Blood Pressure.** Blood pressure was measured using American Diagnostic Compact Wrist Blood Pressure Monitors. Both systolic and diastolic blood pressure measurements were taken at the beginning of each of the 4 sessions. For the treatment group, blood pressure was taken again after the massage treatment.

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## Results

Table I shows the means and standard deviations for the study variables in weeks one and four of the sessions. Because of the small cell sizes, all statistical analyses were conducted using non-parametric techniques.

We examined whether strain would change during the 4-week treatment program. Strain decreased significantly in the treatment group between weeks 1 (M=1.09) and 4 (M=0.73; Wilcoxon Signed Ranks test  $Z = -2.11$ ,  $p < .05$ ) but did not significantly change for the control group.

In order to test our second hypothesis regarding changes in blood pressure across the four treatment sessions, we conducted separate tests for both systolic and diastolic measures. For the treatment group, both systolic (Wilcoxon Signed Rank test  $Z = -2.547$ ,  $p < .05$ ) and diastolic (Wilcoxon Signed Rank test  $Z = -2.103$ ,  $p < .05$ ) decreased. In the control group, no significant changes were noted for either of the blood pressure measures.

**Table I. Means and standard deviations of the study variables for the treatment and control groups**

	Group			
	Treatment		Control	
	Week 1 M (SD)	Week 4 M (SD)	Week 1 M (SD)	Week 4 M (SD)
1. Strain	1.09 (.45)	.73 (.34)	1.08 (.39)	.66 (.40)
2. Systolic Blood Pressure	124.77 (13.2)	117.70 (17.2)	126.88 (17.9)	125.45 (16.2)
3. Diastolic Blood Pressure	77.85 (7.83)	77.7 (12.9)	84.75 (15.6)	84.73 (14.06)

Note: Based on nonparametric analyses, all comparisons for the treatment group are significant ( $p < .05$ ), and all comparisons for the control group are non-significant.

Finally, to evaluate the third hypothesis regarding the effectiveness of massage therapy in reducing blood pressure within single massage therapy sessions, we compared average pre-session and post-session measures for participants in the treatment group. Both systolic (Wilcoxon Signed Ranks test  $Z = -2.48$   $p < .05$ ) and diastolic (Wilcoxon Signed Ranks test  $Z = -2.06$ ,  $p < .05$ ) blood pressures significantly declined within each session.

### Discussion

The presence of stressors within the workplace is normal and inevitable, and in some cases may even act as a motivating force for employees. However, high levels of stressors or subjectively appraised stress experienced by employees is limiting, can stunt employee output, decrease concentration, and increase strain symptoms (15, 16, 31, 6).

Massage therapy has been effective in alleviating strain symptoms in many sample populations and in a variety of contexts (14) and has resulted in positive psychological and physiological health benefits. Therefore, offering massage therapy directly within the organizational setting may be of significant value with regard to incorporating stress management practices into employee life and facilitating compliance with treatment. Moreover, studies have supported the importance of extrinsic rewards, such as massage therapy, in increasing organizational commitment (32).

Our results supported the hypotheses that employee strain and blood pressure would decline over a 4 week treatment period. Moreover, our findings suggest that even single sessions of massage therapy had an effect on blood pressure. We believe that the clinical significance of these findings is enhanced by our use of a minimal intervention (i.e., 20 minute massage once per week) that is easily accommodated in a working day. On-site massage of the type investigated here is a promising means of stress reduction and health promotion within organizations.

### Limitations, Future Research, & Implications

Although the present study did yield significant findings in reducing employee strain and blood pressure, an important limitation concerns the robustness of the data analyses due to the small sample size ( $n=28$ ). Because the 28 participants were further divided into sub-groups, the treatment group consisted of only 14 people and participants in both treatment and control groups sometimes

missed sessions, which resulted in missing data across the four weeks, further reducing the size of the sample and limiting analyses. Several factors (e.g., meetings, rotational days off, and other commitments) contributed to the missing data across the four sessions. We were able to demonstrate an effect of the massage therapy despite this small sample size. We would expect that future research conducted with a larger sample would find more substantial differences in strain and health symptoms.

We also noted several limiting features of our study related to our implementation of the experimental design in a field setting. First, several of the participants stated that this was their first experience receiving massage therapy treatment. Therefore, these participants may have been tense, nervous, or apprehensive about receiving the treatment, which would ultimately affect baseline and subsequent blood pressure readings, as well as the subjective outcome measures. Conversely, despite efforts to provide a relaxing environment, some participants appeared to be excited about receiving the massage treatment, which may have increased their blood pressure levels. Moreover, the setting in which the treatment took place may not have been as conducive with relaxation for some individuals. All participants sat around a boardroom table, leaning into a pillow. This proximity to other individuals may have affected some participants' level of relaxation, which also may affect outcome measures. Finally, the sessions were conducted on Mondays to accommodate the massage therapy students' schedules. Participants reported that Mondays were often one of the busier days within this organization, and the need for participants to schedule their day around attending the sessions each Monday may have actually been a stressor. Therefore, the setting, context, and timing of the treatment sessions should be a weighty consideration prior to replication of this study. In the current case, we suggest that these considerations may have allowed a more robust test of our hypotheses than would have been obtained under more controlled, laboratory conditions.

Another potential limitation of the present study was that the massage therapy treatments were provided by massage therapy students rather than registered professionals. Massage Therapy applied by a professional registered massage therapist would follow an individualized treatment plan indicated by the physical assessment, and not a prescribed routine as applied in our study. However, because students followed a prescribed routine as outlined by their supervisor on how and where to massage each participant,

the treatments were standardized, which would maintain reliability. For this reason, the use of students rather than professionals may have actually been beneficial with regard to standardizing the treatment method used. Nevertheless, we may expect even stronger results in future research when using a standardized treatment protocol administered by professional massage therapists.

Our studies employed a short seated massage, focusing on the head and neck region. More intense, full-body massages, or chair massages (in which the head, neck, back, and arms are treated) may further reduce strain and blood pressure and increase employee well-being. Similarly, future research also may target problem areas (e.g., carpal tunnel syndrome) to improve circulation and overall health. Finally, future research should also consider the use of a diary format study to examine long-term treatment and strain outcomes, and to control for individual work and non-work stressors.

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### Concluding Remarks

Our study has expanded on previous research on massage therapy by focusing on its effects in the workplace. These results have important implications for organizations who are wishing to improve employee health and reduce employee stress and strain. Massage therapy treatment offered to employees as a health benefit directly in the workplace may be a practical, enjoyable, and cost-effective means to reduce strain and blood pressure, and increase general health, creating a safer, healthier workplace.

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**Reprint request:** Dr. Arla L. Day, Department of Psychology, Saint Mary's University, Halifax, NS B3H 3C3; Phone: (902) 420-5854; Fax: (902) 496-8287; E-mail: Arla.Day@smu.ca