



SURVEY

## A survey of musculoskeletal injuries amongst Canadian massage therapists

Wayne J. Albert, Ph.D.<sup>a,\*</sup>, Nadine Currie-Jackson, B.Sc., R.M.T.<sup>b</sup>,  
Carolyn A. Duncan, B.Sc.<sup>a</sup>

<sup>a</sup>*Faculty of Kinesiology, University of New Brunswick, Fredericton, NB, Canada E3B 5A3*

<sup>b</sup>*Atlantic College of Therapeutic Massage, Fredericton, NB, Canada*

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**Summary** A survey was administered to registered massage therapists (RMT) across Canada to determine the prevalence of musculoskeletal pain and discomfort to the low back, shoulders, neck, wrist and thumbs associated with therapeutic treatments. A total of 502 RMT responded to the survey. Despite the majority of the respondents indicating they received proper training in therapy postures and self-care, there was a high prevalence of pain reporting to all areas of the upper extremity. The highest reporting of pain and discomfort was reported in the wrist and thumb, followed by the low back, neck and shoulders, respectively. There were no significant gender differences in pain/discomfort reporting except for the neck. The results of this survey indicate a high prevalence of musculoskeletal pain and discomfort associated with delivering massage therapy treatments. Therapists must focus on proper technique posture and adhere to a regime of self-care to reduce the risks of pain and injury. Further research is needed to determine the effects of neuromuscular fatigue and technique accommodation as it relates to pain risk. Crown Copyright © 2007 Published by Elsevier Ltd. All rights reserved.

### Introduction

Prevalence of musculoskeletal injuries has become a major concern among healthcare professionals. This is believed to be attributed to the physical demands of the tasks within healthcare professions. As a result

of the physical demands associated with patient handling, to date, most research has focused on nursing and nursing aides (Schibye et al., 2003; Skotte et al., 2002). A review of 80 studies published on work-related low back pain in the nursing profession reported an estimated lifetime prevalence of work related low back pain as high as 80% and an annual prevalence of 40–50% (Hignett, 1996).

More recently research has begun to examine work-related musculoskeletal injuries in less

\*Corresponding author. Tel.: +1 506 447 3254;  
fax: +1 506 453 3511.

E-mail address: [walbert@unb.ca](mailto:walbert@unb.ca) (W.J. Albert).

physically demanding healthcare professions such as chiropractors, dentists and dental assistants. Generally, the prevalence rates are still high despite the arguably lower occurrence of high demands associated in the professions. A review by Morse and colleagues (2003) found a 63–93% prevalence of musculoskeletal pain among dental hygienists and Michalak-Turcotte (2000) found 39–56% of dental hygienists had reported having some form of back pain. Within the chiropractic industry in Canada overall prevalence rates of general back pain have been reported as high as 87% with low back pain accounting for 73% of those reporting back pain (Mior and Diakow, 1987). Furthermore, 41% of the chiropractors interviewed felt that the postures they assumed while treating patients were key in their development of back pain. Recently, Bisiachhi and Huber (2006) reported differences in prevalence of musculoskeletal injuries between male and female chiropractors in the United States. Amongst female chiropractors, the low back was the most common site of injury reported (19%), while male chiropractors reported the neck as the most common site of injury (11%). Lorme and Naqvi (2003) further found that when performing treatments, chiropractors were continually subject to dynamic forces that increase spinal loading and resultant risk of injury.

Our research group has recently completed two research studies investigating the biomechanical and postural demands of conducting massage therapy treatments (Albert et al., 2006; Buck et al., in press). The first study investigated the postural and low back demands of performing a standard 45-min massage (Albert et al., 2006) and reported that the percent time spent in non-neutral wrist, shoulder and trunk postures were placing the therapists at risk for soft tissue injury. Although the peak compressive loads estimated on the low back during massage treatments were found to be low, the cumulative load on the low back structures were found to be significant when extrapolated to four or five 45-min massages performed in a day. In our second study we compared the postural and muscular demands of the upper extremity and back when performing a 15-minute On-Site (Corporate) massage with a client in a massage chair and on a massage table (Buck et al., in press). The chair massage required more muscular activity of the upper extremity and non-neutral postures of the wrist and shoulders. The table massage placed greater demands on the trunk posture and musculature with similar non-neutral postures of the wrist.

In interpreting and discussing the relevance of our findings, it became abundantly clear that there

was a lack of epidemiological evidence indicating the prevalence and incidence of musculoskeletal injuries among massage therapists. Therefore, the purpose of the study was to survey massage therapists in Canada to determine the prevalence of musculoskeletal concerns related to the upper extremity.

## Methodology

The study was approved by the University's Research Ethics Board. An advertisement was sent out in the 2005 Winter edition of *Massage Therapy Canada* magazine and emails were sent to the Provincial Associations for distribution to their members inviting Registered Massage Therapists (RMT) from across Canada to take part in the survey. The advertisement directed therapists to the web address to complete the survey online and provided contact information for those wishing to have a paper copy sent to them. The web-based (online) survey was administered on the Atlantic College of Therapeutic Massage (ACTM, Fredericton, NB) web page from January 2005 to March 2005.

## The survey

The survey consisted of five sections. The first section focused on the participant's demographics and general information about their practice. The following 18 questions were asked in this section:

1. Please choose your appropriate age group: 20; 20–30; 31–40; 41–50; > 50
2. Sex: Female; Male
3. Height: \_\_\_\_\_cm/feet
4. Weight: \_\_\_\_\_kg/lbs
5. What Province/Territory do you currently work in? (Note: a list of Provinces and Territories was provided as well as an option for Outside of Canada).
6. What Province/Territory did you graduate Massage Therapy School from? (Note: a list of Provinces and Territories was provided as well as an option for Outside of Canada).
7. In what decade did you graduate from massage therapy school?  
Before 1970; 1970–1980; 1981–1990; 1991–2000; 2001–Present
8. How many years have you been a Massage Therapist?  
0–5 yrs; 6–10 yrs; 11–15 yrs; 16–20 yrs; More than 20 years

9. On average how many hours per week do you perform massage treatments?  
Less than 10 h; 10–20 h; 21–30 h; 31–40 h; More than 40 h
  10. Were you educated on Self-Care/Maintenance at your Massage Therapy School? Yes/No
  11. Are you currently involved in a Self-Care/Maintenance regime for your physical and mental well-being? Yes/No
  12. If “yes” to question 11, then please choose which of the following apply to you.  
Yoga; Massage Therapy; Tai Chi; Exercise (i.e. running, swimming, etc.); Healthy Diet; Vitamin and Mineral Supplements; Pilates; Meditation; Reading; Stretching; Other
  13. Did you receive formal training in proper massage therapist posture from a school or college? Yes/No
  14. Do you use a Hydraulic/Electric table? Yes/No
  15. Do you consistently adjust your Massage Table when necessary? Yes/No
  16. The majority of your massage therapy treatments are performed: Therapist standing/Therapist sitting
  17. Which of the following do you focus on most during your massage treatments? (You can choose more than one)  
Superficial light techniques (such as lymphatic drainage); Moderate pressure techniques (such as petrissage techniques); Deep pressure techniques (such as ischemic compressions)
  18. The majority of your massage treatments are performed in: Client in supine/prone; Client in side-lying; Client in seated; Other
7. Have you changed jobs due to low back trouble? Yes/No
  8. Have you had low back trouble in the last 7 days? Yes/No
  9. Do you use a massage aid to prevent injury or re-injury? Note: *a massage aid can be any device used to supplement physical mechanics.* Yes/No

### Data analysis

A descriptive analysis was conducted to determine the incidence of work related low back, shoulder, neck, and wrist/thumb pain or discomfort experienced by massage therapists. One sample Pearson's chi-square tests were used to assess whether therapist's age, gender, decade of school attendance, years of practice, number of hours practiced weekly, self-care/maintenance, posture training, use of a hydraulic table, constant adjustment of the massage table, and use of a massage aid affect the rate of low back, shoulder, neck, and wrist/thumb. Correlation coefficients were computed among the four musculoskeletal pain regions using a Spearman's rho test.

### Results

#### Demographics and work practices

A total of 502 RMTs answered the survey. The provinces of British Columbia, Ontario and New Brunswick constituted the majority of the respondents (Table 1). In summary, 417 female and 85 male RMT responded to the survey. Two-thirds of the respondents were between the ages of 20 and 40 and just over half had 5 years experience or less. Approximately 40% of the respondents indicated they worked between 20 and 40 h/week, with 15% indicating they worked less than 10 h/week and 30% indicated working 20–30 h/week. The pie charts in Fig. 1 illustrate the age distribution, years of work experience and work distribution of the respondents.

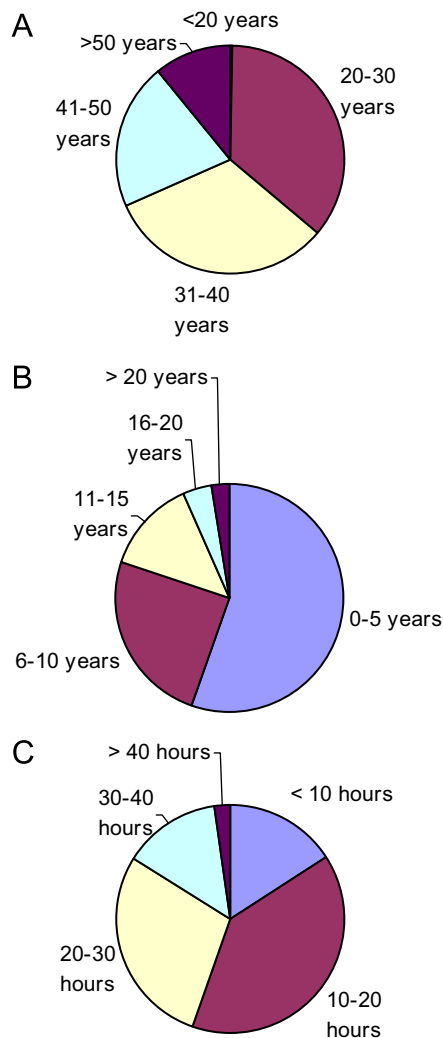
It was encouraging to note that 87% of the RMT indicated that they received education on Self-Care/Maintenance during their education and that 92% currently engage in a Self-Care/Maintenance regime for their physical and mental well-being, which included healthy diet, vitamin and mineral supplements, regular exercise and stretching. As well, 89% indicated receiving formal training in proper massage therapist posture during their education. However, only half of the RMT surveyed suggested that they consistently adjusted their massage table when necessary which may be

The next four sections were identical questions related to the (1) lower back; (2) neck; (3) shoulder; and (4) wrist and thumb pain, respectively. The questions for these sections are listed here using the low back as an example. The questions were repeated replacing low back with neck, shoulder and thumb, respectively.

1. Have you ever had low back pain/discomfort during or after work? Yes/No
2. Have you ever had a low back related accident/injury? Yes/No
3. If “yes” to question 2, was professional treatment sought? Yes/No
4. How often have you had low back trouble in the last 30 days? Often; Sometimes; Rarely; Never
5. Has low back trouble reduced work activity? Yes/No
6. Has low back trouble reduced leisure activity? Yes/No

**Table 1** Summary of responses to the survey questions pertaining to respondent demographics and work practices presented by Canadian Province.

	Responses	% Working in Province	Sex		Province trained	Educated in self care		Involved in self care regime		Received training in proper posture		Hydraulic table		Adjust table	
			Male	Female		#	%	#	%	#	%	#	%	#	%
Alberta	45	9.0	6	39	38	39	86.7	43	95.6	41	91.1	2	4.4	15	33.3
British Columbia	118	23.5	34	84	103	98	83.1	110	93.2	105	89.0	59	50.0	63	53.4
Manitoba	16	3.2	3	13	14	12	75.0	15	93.8	15	93.8	4	25.0	7	43.8
New Brunswick	108	21.5	14	94	98	100	92.6	100	92.6	102	94.4	17	15.7	51	47.2
Newfoundland and Labrador	5	1.0	0	5	2	5	100.0	5	100.0	5	100.0	0	0.0	2	40.0
Nova Scotia	33	6.6	1	32	37	27	81.8	29	87.9	30	90.9	7	21.2	12	36.4
Ontario	152	30.3	20	132	176	130	85.5	141	92.8	129	84.9	46	30.3	75	49.3
Prince Edward Island	2	0.4	1	1	0	1	50.0	1	50.0	2	100.0	0	0.0	1	50.0
Quebec	14	2.8	6	8	16	13	92.9	12	85.7	11	78.6	0	0.0	9	64.3
Saskatchewan	8	1.6	0	8	12	7	87.5	8	100.0	8	100.0	3	37.5	3	37.5
Yukon	1	0.2	0	1	0	1	100.0	1	100.0	1	100.0	0	0.0	0	0.0
Outside Canada	0	0.0	0	0	6										
<b>Total</b>	<b>502</b>		<b>85</b>	<b>417</b>	<b>502</b>	<b>433</b>	<b>86.3</b>	<b>465</b>	<b>92.6</b>	<b>449</b>	<b>89.4</b>	<b>138</b>	<b>27.5</b>	<b>238</b>	<b>47.4</b>



**Figure 1** Subject demographics breakdown of: (A) age of the respondents, (B) their years of experience, and (C) their average work week.

attributed to only a third having hydraulic or electric massage tables at their place of work making adjustments more time consuming.

## Pain reporting

The reporting of low back, neck, shoulder and wrist/thumb pain/discomfort was higher than expected, with over 60% of respondents reporting low back pain/discomfort related to work, and over 80% reporting pain/discomfort in the wrist and thumb. In the last 30 days pain or discomfort was experienced often or sometimes by 24–52% of therapists and 30–50% had experienced pain in the region in the last 7 days. Furthermore, incidence of work related accident or injury was greater than 31% for all regions of which at least 74% required some form of treatment. This pain/

discomfort resulted in 25% of therapists reporting disruptions in work and leisure activities. Less than 10% of respondents reported changing work activities, however, over 75% reported seeking medical treatment for their pain. A little over 20% of the respondents reported using a massage aid to help them while they were in pain. Table 2 provides a summary of the responses to the nine pain/discomfort survey questions.

## Correlations between demographics, work practices and pain reporting

**Low back pain:** The results of chi-square test on low back pain/discomfort were significant for the age,  $\chi^2(4, N = 502) = 25.650, p = 0.001$ , years of practice,  $\chi^2(4, N = 502) = 19.223, p = 0.01$ , and decade of school attendance,  $\chi^2(3, N = 502) = 19.368, p = 0.001$ . The proportion of therapists who had experienced pain was generally greater in the lower age group and those with less work experience. It was also higher for those who had recently attended school (Fig. 2).

**Neck pain:** The results of chi-square test for neck pain/discomfort were significant for the gender,  $\chi^2(1, N = 502) = 13.653, p = 0.001$ , and years of experience  $\chi^2(4, N = 502) = 9.711, p = 0.046$ . The proportion of females who experienced neck pain/discomfort was significantly higher. As well, RMT who had only been practicing for 0–5 years had a higher reporting of neck pain/discomfort.

**Shoulder pain:** The results of corrected chi-square test for shoulder pain or discomfort were significant for the use of a massage aid only,  $\chi^2(1, N = 502) = 4.516, p = 0.034$ . The incidence of shoulder pain was significantly higher for those reporting the use of massage aids.

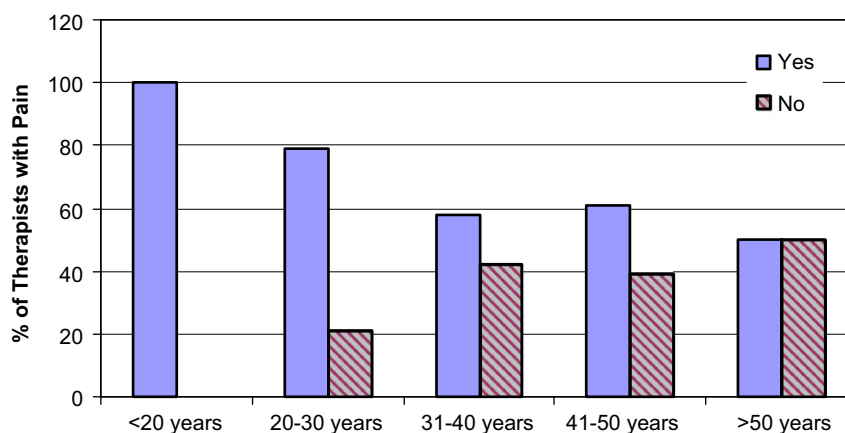
**Wrist and/or thumb pain:** The results of corrected chi-square test for wrist and/or thumb pain/discomfort were significant for use of a massage aid only,  $\chi^2(4, N = 502) = 5.436, p = 0.02$ . Incidence of wrist or thumb pain was significantly lower in those that use massage aids.

## Discussion

The high prevalence of musculoskeletal pain and discomfort reported by the RMT in this study reflects the growing trend reported among other manual therapeutic professionals. Studies investigating the musculoskeletal demands of chiropractic therapies have suggested that high prevalence of low back pain ranging from 57% (Rupert and Ebete, 2004) to over 85% (Mior and Diakow, 1987) can in large part be attributed to the postural demands of

**Table 2** Summary of responses to survey questions regarding the effects of work related pain.

Question	Low back		Neck		Shoulder		Wrist/thumb	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
1. Work-related pain	65.3	34.7	66.5	33.5	62.2	37.8	83.3	16.7
2. Pain due to accident or injury	39.4	60.6	50.4	49.6	34.7	65.3	31.7	68.3
3. Professional treatment sought for accident or injury	91.4	8.6	84.6	15.4	81.4	18.6	73.9	26.1
4. Work time lost due to pain	11.4	88.6	11.6	88.4	14.7	85.3	25.2	74.8
5. Leisure time lost due to pain	20.5	79.5	22.5	77.5	21.8	78.2	20.6	79.4
6. Did pain result in a change of job	3.2	96.8	3.8	96.2	2	98	3.4	96.6
7. Experience of pain discomfort in last 7 days	29.5	70.5	48.8	51.2	35.3	64.7	40.7	59.3
8. Use of massage aid to avoid re-injury	33.3	66.7	29.9	70.1	24.8	75.2	30.6	69.4

**Figure 2** Percentage of registered massage therapists reporting low back pain by age group.

the treatment technique, patient positioning (Mior and Diakow, 1987) and the table height used when providing different manipulations (Lorme and Naqvi, 2003). Furthermore, Homack's (2005) study found that in addition to the low back that shoulders and wrists of chiropractor's were most at risk, again citing patient handling and specific patient postures as the primary injury cause. A survey conducted at an annual physiotherapy meeting had 74% of the 133 respondents reporting having had low back pain in their lifetime (Rugelj, 2003). The physiotherapists also reported work-related pain in their neck (20%), shoulders (15%) and wrists and hands (15%), however at significantly lower rates than the RMT in this study.

Bisiachhi and Huber (2006) agreed with the previous research that the most common cites of injury to chiropractors were to the upper extremities, however, there were differences in the reporting patterns of males and females. The females reported back pain more often and the males complained more of neck pain. Only 1% of

the males surveyed complained of either wrist or shoulder pain, whereas the females reported prevalence was 17% and 13%, respectively, for these areas. Our study revealed a gender difference in neck pain only. However, gender differences are difficult to assess in this study, as males constitute only 17% of the survey sample.

Our recent investigation of the biomechanical demands on the therapist indicated that they were exposed to relatively high cumulative spine loads and assumed non-neutral posture of the neck, shoulders and back for a significant period of the treatment time thus increasing their risk of potential musculoskeletal injury (Albert et al., 2006). These findings were our motivation for exploring the prevalence of musculoskeletal complaints as a confirmation of our biomechanical results. Although the reporting of discomfort was expected, the high prevalence of pain/discomfort reporting was surprising since a large percentage of the RMT suggested that they engaged in a regime of self-care and received education on self-care and

proper technique posture. Unfortunately, the use of a structured closed survey does not permit knowledge on the quality of the self-care and postural education received, nor can it measure the adherence of the therapists to proper technique usage. In experienced manual material handlers, for example, the majority did not adopt the biomechanical correct lifting posture, despite receiving training and periodic refresher courses on proper postural technique (Baril-Gingras and Lortie, 1995; Kuorinka et al., 1994). Instead they chose a less physiologically demanding technique thereby prolonging the onset of neuromuscular fatigue.

The use of proper technique may also be compromised with fatigue to the musculature of the upper extremity. The only correlation between the amount of time worked and reporting of pain was for the neck. The majority of the respondents indicated working between 20 and 40 h/week and it is conceivable that changes in technique may occur over the course of a day to accommodate for fatigued muscles. Naturally, the question of the effects of fatigue on individual technique cannot be answered from this research survey but is an area that our research group intends to explore since the majority of the pain and discomfort would be a result of repetitive exposure.

It was interesting to note that the prevalence of low back pain was higher for younger age groups which naturally correlates with those with less years of work experience reported higher prevalence of pain (Fig. 2). This is not dissimilar to findings in industrial populations where a large percentage of the experienced workers have adopted techniques that have permitted them to survive their careers without injury (Stevenson et al., 2001). Investigating the work strategies of these 'survivors' may be the key to development of guidelines for proper work technique.

## Limitations

The nature of the study may lend itself to a selection-bias, where those who are suffering with musculoskeletal pain may be more inclined to take the time to answer the survey. However, the staggering incidence rates reported by these respondents provides a clear rationale for further investigation into the musculoskeletal demands of the occupation. Furthermore the pain and discomfort reporting aligns with the biomechanical demands of the job reported previously (Albert et al., 2006).

The ratio of male to female respondents in this study limits the statistical gender comparisons due

to the unbalanced group sizes. However, the proportionally higher female participant rate is reflective of the profession. The membership of American Massage Therapy Association (2005) is currently 84% female which maps on nicely to our 82% female respondent rate (<http://www.amta-massage.org>).

The closed survey limits the exploration into the factors that led to the pain and discomfort reporting as well as the associated levels of pain and discomfort. A discussion with respect to fatigue would have provided additional insight into the mechanism of pain and discomfort but would have been difficult to acquire in this methodological approach. The closed survey was chosen as an online survey was felt to be the most logical way of reaching a larger cross-sectional area of RMT in the country.

## Conclusion

Our previous research has demonstrated that there exists a biomechanical and neuromuscular demand with performing massage treatments. The survey administered to registered massage therapists across Canada revealed that therapists are experiencing musculoskeletal pain and discomfort in the low back, shoulders, neck, wrists and thumbs associated with the therapeutic treatments. The challenge is to provide recommendations for proper technique to ensure a long and healthy career. To accomplish this goal there is a need for further investigation into the current state of postural and self-care training for massage therapy students and an assessment of the changes in treatment techniques used in the presence of muscular fatigue.

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