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Title of Thesis: "An Interpreter's Interpretation:
Sign Language Interpreters' View of
Musculoskeletal Disorders"

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ABSTRACT

Title of Thesis:	An Interpreter's Interpretation: Sign Language Interpreters' View of Musculoskeletal Disorders.
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Sign language interpreters are at increased risk for musculoskeletal disorders. The present study used content analysis to obtain detailed information from the interpreter's point of view. Risk factors for initiation and/or exacerbation of symptoms included: difficult job, setting (educational), style (e.g., posture, self generated force), and emotional and physical stressors. Symptom management included self-care methods such as exercise, diet, and warm up prior to interpreting. Coping strategies that were more active (e.g. more control over work schedule) were reported as useful. Additional findings included the use of complementary alternative medicine, the possible preventative use of exercise in these upper extremity disorders, and a starting point for exposure levels to interpreting situations. The results also highlight the need to investigate the clinical effectiveness of approaches such

as acupuncture and the use of active coping behaviors in the
prevention and management of these symptoms.

AN INTERPRETER'S INTERPRETATION:

SIGN LANGUAGE INTERPRETERS' VIEW

OF MUSCULOSKELETAL DISORDERS

by

William L. Johnson

Thesis submitted to the Faculty of the

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Overview of study

Chronic muscle pain is second only to the common cold for reasons people seek medical treatment (Bonica, 1992). This study will review the existing prevalence literature in both the general population and more specifically for sign language interpreters. The literature indicating that both biomechanical and psychosocial factors may be causally related to musculoskeletal disorders in sign language interpreters is provided. A review of existing studies that have utilized qualitative research methods that focus on musculoskeletal disorder is provided next, followed by the goals for the present study.

The remainder of the paper explains methods, results and outcomes of the current study. The method section includes an explanation of the way in which content analysis was used and provides examples of the methods used to develop the codebook. The results highlight findings related to initiation or exacerbation of symptoms, individual's responses when symptoms develop, prevention methods, and individuals desire to discuss their symptoms. Inter- and intra-rater reliability, which are both high, are also provided. The discussion then focuses on specific implications of the results as well as limitations of the current study and areas for future research.

Background and social costs

An estimated 75-80 million people seek treatment
each year for chronic muscle pain. This level of treatment
places chronic muscle pain as second only to the common cold
for reasons people seek medical treatment (Bonica, 1992).
Treatment of musculoskeletal pain represents a significant
drain on the health care system, industry, and society. The
economic burden imposed as a result of compensation costs,
lost wages, and lost productivity as a result of work-
related musculoskeletal pain have been conservatively
estimated between $45 and $54 billion annually (National
Research Council, 2001). Approximately one million people
took time off from work in 1999 to seek treatment or to
recover from work-related musculoskeletal pain of the low
back or upper extremities (National Research Council, 2001).
Disorders of the upper extremities, including carpal tunnel
syndrome, tendonitis, rotator cuff injuries, and a variety
of nonspecific complaints, accounted for 9.4 percent of all
musculoskeletal disorders in the United States in 1988
(Tanaka et al, 1994). These prevalence rates for upper
extremity disorders represent a significant portion of the
population and these disorders are not limited to the United
States – they have similar impact in other countries
(Frederiksson et al., 1999). The exact etiology of work-

related upper extremity disorders (WRUEDs) is unknown.
However, various risk factors associated with their
development have been identified.

Psychosocial Risk Factors

In their review of cross-sectional studies, the
National Research Council (NRC; 2001) identified several job
and non-work stressors related to the presence of upper
extremity disorders. These stressors included high-perceived
job stress (OR=2.0), high job demands (OR range = 1.5-2.4),
and non-work related tension, worry, or psychological
distress (OR range = 1.4-4.8). However, in the one
prospective study reviewed by the NRC (2001) only increased
perceived monotony was associated with discomfort of the
wrist (OR=3.1 95% CI: 1.2-7.8). Work organizations in which
there was no job rotation between different workstations was
shown to be a factor in the development of carpal tunnel
syndrome (CTS; OR=6.3 95% CI: 2.1-19.3) in a longitudinal
study.

Ergonomic exposures have also been shown to be risk
factors. Odds ratios however vary from study to study and
are also dependent on the population and characteristics of
the job. For instance high force and high repetition have
been associated with CTS in several of the NRC (2001)
reviewed studies. For instance in industrial workers high

force and repetition played a part in development of symptoms and disorders (OR=15.5 95% CI: 1.7-141.5); while among frozen food factory workers only repetition and/or cold exposure were associated with symptoms and disorders (OR=7.4 95% CI: 1.0-27.5). These ergonomic risks seem to indicate that repetition is one of the key factors in development of upper extremity symptoms and disorders.

Gerr and colleagues (2002) and Marcus and colleagues (2002) produced one of the most comprehensive prospective studies to examine risk factors for musculoskeletal symptoms and disorders in office computer users. While these studies were completed after the NRC (2001) review, they provide additional information to help understand other risk factors and future areas of study. Gerr and colleagues' (2002) findings for psychosocial risk factors indicated that some of the more common areas such as perceived job stress and monotony were not indicative of the development of symptoms or disorders. Instead they found that females (Hazard Ratio HR=2.4 95% CI: 1.3-4.7), 2-5 years of prior computer use (HR=2.7 95% CI: 1.3-5.5), and over 5 years of prior computer use (HR=2.3 95% CI: 1.1-4.5) were significantly associated with the development of hand and/or arm disorders. As part of the same study postural factors were examined and those individuals with a wrist radial deviation greater than 5

degrees while using the mouse had a greater risk than those
with a neutral wrist posture between –5 to 5 degrees
(HR=2.03, 95% CI: 1.09-3.8). Greater key activation force
(i.e. over 48 g) was also associated with an increased risk
for hand and arm disorders (HR=1.66 95% CI: 0.81-3.41).
Additionally the location of the "J" key being over 12 cm
from the edge of the desk was shown as a protective factor
(HR=0.52 95% CI: 0.29-0.93; Marcus et al., 2002).

Unfortunately since these studies and those reviewed by
the NRC (2001), utilized different stressor and ergonomic
measures, various outcome measures, and different diagnostic
categories it is difficult to compare these studies on an
equal basis. Yet they do allow for identification of a
pattern of potential risk factors. The main conclusion of
the NRC review identified the main risk factors for upper
extremity disorders as high-perceived job stress and job
demand, ergonomic factors (e.g. force, repetition, posture,
vibration), general worry, and an interaction of these
factors (National Research Council, 2001). Gerr and
colleagues' (2002) findings support the findings that
ergonomic factors are involved; yet their results imply that
psychosocial factors may be more variable than the NRC's
(2001) conclusions and may be specific to each occupational
category.

Risk in Sign Language Interpreters

     Sign language interpretering is one specific occupational group that is at increased risk for disorders of the upper extremities. A survey of 40 interpreters for the deaf at a regional conference of the Registry of Interpreters in 1991 revealed that 87.5% experienced at least two of the symptoms of repetitive stress injuries (Stedt, 1992). Additionally, those surveyed reported knowing an average of four other interpreters who also had symptoms (Stedt, 1992). During the 1988-89 academic year at Rochester Institute of Technology 45% of the 60 full time interpreters reported either full disability or working a reduced interpreting load because of pain associated with disorders of the upper extremities (DeCaro, Feuerstein, & Hurwitz, 1991). In a random sample of registered interpreters in Texas, Adkins (1998) found that 36% of the 171 surveyed interpreters reported a history of upper extremity symptoms. Individuals with symptoms in this study were not limited to full time workers but also included part time workers. In the first national prevalence study, Feuerstein and colleagues (1997) found that of the 1398 surveyed interpreters, 74% reported symptoms in the neck and 70% in the hand/wrist area. Almost a third of these participants

claimed that they experienced these symptoms at least once a week.

In a more recent prevalence study, Scheuerle, Guilford, and Habal (2000) surveyed a random sample of 250 certified interpreters, with 145 responses. These participants were identified from the Registry of Interpreters for the Deaf and mailed a questionnaire about their experience of pain and discomfort during and after interpreting. They focused on any pain or discomfort in the Upper limbs, shoulders, neck, back, and hands. They found that 82% of surveyed interpreters indicated some pain or discomfort in these body areas.

In a prevalence study that focused solely on hand and wrist disorders in sign language interpreters, Smith, Kress, and Hart (2000) found that 59% of the 184 respondents to their survey experienced hand or wrist problems. Smith and colleagues (2000) also found that 26% of their respondents experienced pain severe enough to negatively impact their work. The results from these two recent studies (Scheuerle, Guilford, and Habal 2000; Smith, Kress, and Hart 2000) suggest that even with the greater awareness of musculoskeletal disorders related to sign language interpreting since Feuerstein and colleagues (1997) completed their first prevalence study, musculoskeletal

disorders are still quite common among this population of workers.

Biomechanical Risk Factors

Several studies have proposed various biomechanical and ergonomic factors as being related to the development, exacerbation, and maintenance of upper extremity disorders in sign language interpreters. High frequency movement, especially of the fingers and wrists, awkward and repeated movements, and short rest periods contribute to development of symptoms and disorders (Shealy, Feuerstein, & Latko, 1991). Shealy and colleagues (1991) analyzed movement frequency, counts of individual movements, joint movement velocities and accelerations, and range of motion by interpreters. They found that forearm and wrist movement occurred at a frequency of 13,500 movements per 50-minute lecture. Feuerstein and Fitzgerald (1992) found that interpreters with pain took fewer rest breaks, had more frequent hand and wrist deviations from neutral, more frequent arm movements outside an optimal work envelope, and faster finger and hand movements than those interpreters without pain. These results suggest that the awkward positioning, high frequency and velocity of movements, and repetition are possible biomechanical factors in the development, maintenance, and exacerbation of symptoms.

One of the puzzling aspects of the development of symptoms for sign language interpreters however, is the lack of instruments or tools other than the hands themselves. Thus this occupation can be useful to study because of the absence of confounding tool use. In the NRC (2001) report high force was associated with upper extremity symptoms yet the force for interpreters is self generated and not against an opposing force such as a computer keyboard.

Psychosocial Risk for Sign Language Interpreters

Biomechanical factors alone cannot completely explain symptoms in sign language interpreters. The prevalence study by Feuerstein and colleagues (1997) included various self-report questions regarding demographics, work, work stress, pain, symptoms and diagnosis, and other factors associated with UED risk factors. Based on previous research the authors utilized a limited number of variables shown to be associated with case status. These a priori variables were then entered to identify those that best predicted case status. The authors concluded that females (OR=0.95, p=.05), number of years worked (OR=1.04, p=.01), constant job pressure (OR=1.08, p=.001), fear of developing problems at work (OR=1.18, p=.0001), tendency to continue working with pain to insure a high quality of work (OR=1.13, p=.01), and wrist deviations from neutral (OR=1.08, p=.01) were modestly

associated with case status involving hand symptoms. They also identified three variables that discriminated between cases with lost work time from those without lost time. These variables included; high levels of fear of developing a pain problem at work, increased tendency to continue to work in a painful way to insure high quality, and less ability to use one's own initiative at work. This study utilized various questionnaires and surveys based on previous research to identify those variables associated with symptoms. One area of interest was the interpreters' own perception of their risk and protective factors outside of the constraints of the survey. In other words, what did the individual interpreters view as indicative of contributing to or preventing them from developing symptoms. An open-ended question was asked as part of this study that was believed to be a method to highlight an individuals' perception of what contributes to or protects them from developing symptoms. As this was an open-ended response traditional quantitative methods are limited in evaluating this type of data. Qualitative methods, such as content analysis, are required to obtain a better understanding of the interpreters' perceptions.

Qualitative Method

Needleman and Needleman (1996) called for an increase in qualitative methods in occupational research. These types of studies have ranged from men's description of pain from fibromyalgia (Paulson, Danielson, Larsson, Norberg, 2001) to the experiences of women with pain from repetitive stress injuries (Reid, Ewan, Lowy, 1991) to job related stress in home care personnel (Brulin, Winkvist, Langendoen, 2000).

Qualitative methods can aid in understanding individual differences in the development of various disorders (Needleman & Needleman, 1996). For example, many studies have examined the risk factors associated with upper extremity disorders (NRC, 2001; Bongers, Kremer, & ter Laak 2002). Yet the results from these analyses have been inconsistent and there are still questions regarding why some individuals develop UEDs while others with the same risk factors do not. This method provides greater range of inquiry and potentially a more thorough preliminary understanding of the phenomena being investigated (Needleman & Needleman, 1996). Having an increased understanding of the individual's perception of potential contributing factors can be useful in generating hypotheses, which can then be tested in future controlled studies.

Content analysis is one form of qualitative analysis that involves a systematic strategy of decomposing messages and then evaluating and classifying their content in order to reveal specific characteristics (Rosenthal & Rosnow, 1991). This method allows for the conversion of qualitative information into a format that can be readily analyzed, such as frequency of various responses. Rosenthal and Rosnow (1991) highlight four distinct advantages to this method. First it requires few resources to develop a coding system and implement it. While labor intensive, it requires minimum investment. It is flexible, in that information can be added if information is missed or incorrectly coded. This flexibility allows the coding system to be adjusted if there are changes over time in what is being measured. This type of flexibility is not normally found in traditional experimental or survey studies. Finally, it requires the researcher "to scrutinize the material that they are evaluating and classifying by specifying category criteria and assessing their success in measuring qualitative phenomena" (Rosenthal & Rosnow, 1991). For these reasons content analysis was considered as an ideal means for evaluating sign language interpreters' perception of risk and protective factors regarding musculoskeletal disorders.

Present Study

Currently there are relatively few qualitative studies examining risk factors in upper extremity symptoms. One study specifically focused on psychosocial stress in the work environment of home care personnel (Brulin, Winkvist, & Langendoen, 2000). Other work in this area has centered on the patient's perception of their treatment (Reid, Ewan, & Lowy, 1991) or their illness (Paulson, Danielson, Larsson, & Norberg, 2001). Brulin, Winkvist, and Langendoen (2000) interviewed home care providers in Sweden with neck, shoulder, and back complaints. The majority of home care providers indicated that stress related to work, finances, and inability to provide adequate patient care was the most significant cause of musculoskeletal symptoms. Additional factors included poor communication in the work place between the hospitals and the care providers when patients were hospitalized, the physical factors in the work environment such as lifting patients alone and time constraints, and financial cut backs that negatively impact the working conditions. In general most of the home care personnel indicated that they worked only part-time in order to better cope with their work. Many indicated that social support in the work place helped to reduce or at least allowed the individuals to better cope with their discomfort

and pain (Brulin, Winkvist, & Langendoen, 2000).
Additionally, Reid and colleagues (1991) interviewed chicken factory and telecommunication workers with repetitive strain injuries. They found that these individuals' greatest perception was that health care providers did not believe their symptoms and questioned their integrity. They perceived that their care providers saw them as "malingering" or otherwise trying to obtain some type of "secondary gain". Paulson and colleagues (2001) evaluated men's experience of pain associated with fibromyalgia. They found that men reported two types of pain, "bothersome" and "non-troublesome". Importantly they found that men often used metaphorical statements to describe their pain (e.g. "I feel a band of iron around my head, like carrying a heavy crown", implying that medical staff need to clarify the locations and sensations of symptoms in order to provide comprehensive care to men with pain related to fibromyalgia. However, these studies have not examined the perceived protective factors, response to symptoms, or risk factors associated with musculoskeletal disorders or in this occupational field.

The aim of the present study was to utilize qualitative research methods to analyze the open-ended question asked by Feuerstein and colleagues (1997) in their study of sign

language interpreters. The question asked was "In the space below, please tell us what you are doing, if anything, that you think is contributing to your symptoms or preventing you from experiencing symptoms. Please use additional paper if you need more room." This study is not a true qualitative research project in the sense that the question had already been asked and follow up questioning was not possible. It did however lend itself to content analysis (Rosenthal & Rosnow, 1991), allowing for the categorization of responses. It is anticipated that this qualitative analysis will provide data to evaluate the following;

1. Individual responses will confirm suspected factors associated with UE symptoms/disorders in sign language interpreters.

2. Protective factors for sign language interpreters that can then be utilized for future studies can be identified with this technique.

3. A range of interventions sign language interpreters have used to prevent and manage symptoms can be described and categorized.

Method

This study utilized content analysis to categorize written responses to an open-ended question regarding risk and protective factors of musculoskeletal disorders in sign

language interpreters. The participants in this study were 1398 sign language interpreters who were members of the Registry of Interpreters for the Deaf (Silver Spring, MD) and who were involved in a previous health outcome correlates study (Feuerstein, Carosella, Burrell, Marshall, DeCaro, 1997).

The demographics of this sample have been reported elsewhere (Feuerstein, 1993) and will only be summarized here. The responders were predominately female (86.8%) with a mean age of 39.3 (sd 8.9). Formal training as an interpreter was common (68.6%) as was certification by one of the certifying agencies (76.2%). Most had spent substantial duration of their lives in the interpreting profession (11.4 years, sd 6.5) and averaged 21.8 hours per week interpreting (sd 11.6). The majority reported symptoms of pain, aching, stiffness, burning, numbness, or tingling in the neck (73.6%), hand/wrist (69.6%), and/or shoulder (60.0%). While less than half of those surveyed reported symptoms in the lower back (48.6%), upper back (44.1%), forearm (44.2%), and/or elbow (33.6%).

To develop an overall sense of the material, all responses were read prior to data analysis. A codebook based on categories of responses was then developed to determine the various factors that the interpreters view as important

(see table 1 for categories). The categories for coding were based on the 100 longest responses. This strategy was based on the belief that most, if not all, possible categories would be included in some form or another in the 100 longest responses (Shaughnessy & Zechmeister, 1985).

Various individual responses were highlighted as part of the development of categories. Initially four main themes emerged, which served as the main categories: (1) factors that contributed to the initiation or exacerbation of symptoms, (2) response to symptoms, (3) prevention of symptoms, and (4) general statements about symptoms or treatment. The individual responses were then placed into the main categories, using either key words such as exercise or the actual statement. Once these key areas were identified for the 100 responses they were then organized into themes (see tables 2-4) and duplicate responses eliminated. The themes then became the sub categories and the individual responses were maintained to generate more specific information related to the categories.

Initiation or Exacerbation of symptoms

For factors relating to initiation or exacerbation of symptoms there were four categories related to work. Also two were related to personal factors and one was related to

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sign language interpreter training. Comments related to <u>job content</u> and task included such items as:

"If I feel like I have little control or am very bored at work, I will concentrate on any physical symptoms I can."

"Interpreting difficult 100 minute classes alone several times a week, sometimes two such classes back-to-back with only a short (15 minute) break, triggered my symptoms."

External factors that were related to medical conditions such as arthritis and acute trauma (e. g. car accident, sporting injury) were coded separately from work factors and other external factors. Examples of some of these personal <u>external factors</u> included:

"I suspect my symptoms are exacerbated by a lack of regular exercise."

"I do a lot of writing in my non-interpreting work. This seems to contribute to tension and pain in my right forearm."

<u>Response to Symptoms</u>

Response to symptoms was accomplished similarly. Work factors, external personal factors, and medical responses to symptoms were all reported.

Examples of work factor responses included adjusting or changing work task:

> "I have drastically reduced my interpreting hours in lieu of referring other interpreters" (Participant started her own business to refer other agents rather than continue interpreting herself.)

> "Getting headsets at some job locations as well as buying my own and carrying with me" (in response to neck pain from phone interpreting without a headset).

Coding for external factors was based on comments such as:

> "I've stopped out-of-work activities such as running, biking on long bike trips, and cross stitching."

> "I do a lot of my grooming, driving, etc. with my left hand now."

Prevention of Symptoms

Prevention factors also covered work and external factors for coding. Examples of some of the work factors include interpreting style and content or work task. Examples of interpreting style included:

> "I believe it (lack of symptoms) is due to greater use of ASL-like signing and ASL features in the English like signing."

"My prevention strategies include use of co-articulation {signing with both hands, one hand signing one sign while another hand signs another} so I can sign faster and more efficiently."

Work content/task comments included:

"I only accept work that I am personally interested in, in terms of subject, presenter, etc."

"Require short breaks when interpreting lectures longer than 50 minutes."

Comments pertaining to external factors included:

"I do keep myself in good physical condition which may help prevent my symptoms."

"I warm up stretch my hands and forearms while I drive to work."

General statements about symptoms or treatment

This category developed because individuals provided responses about their experiences with treatment providers and their symptoms that did not fit in the previous categories. This category arose to ensure that a broader view of interpreters' experiences would be captured and was limited to only one allowed response. An example may provide a better understanding of this category:

" I began to experience the symptoms in R. shoulder, elbow, and wrist during my sabbatical, Spring '92, when I

went back to freelance interpreting. During the 6 yrs prior

to that I had done little interpreting… Once it occurred,

the slightest irritation will cause a flare up. I need to

preserve my arms for working on papers that I am writing…"

Coding

All of the responses were then coded based on the 4

categories and 18 sub-categories developed and analyzed for

content and frequency of responses. Participants' responses

were allowed to include more than one category and multiple

responses in categories (except four) and sub categories.

Multiple responses within sub categories such as weight

lifting and swimming were both counted as exercise (see

table 1). A second coder then utilized the codebook to code

a randomly chosen 5 percent of the responses to ensure the

reliability of the categories in the codebook. Additionally,

to ensure the reliability of the original coder, 5 percent

were recoded to measure intra-rater reliability (Denzin &

Lincoln, 2000). The reliability was computed based on the

percentage of agreement between raters using the standard

formula (Shaughnessy & Zechmesiter, 1985):

$$\frac{\text{\# of times observers agree}}{\text{\# of opportunities to agree}} \times 100$$

Agreement was based on the overall agreement of raw

frequencies within each sub category. For example if

exercise for a subject was score with the same frequency by both raters it was counted as agreement. However, if the rater frequencies were not exact it was only counted as an opportunity, within that category, to agree. Acceptable reliability was based on the values recommended by Shaughnessy and Zechmesiter (1985) that reliability greater than 85% would be desired with anything less than 70% being unacceptable.

Results

In the original study a total of 2410 sign language interpreters were initially contacted by mail. Of these 1398 returned usable surveys. Of these participants, 1092 (78%) provided written responses to the open-ended question for analysis. The un-codeable data included 279 (20%) responses that were missing from the original data, 3 (0.2%) provided no written response, 1 (<.01%) response was unreadable, and 1 (<.01%) individual reported only psychological symptoms but no physical symptoms. The remaining 23 (2%) provided non-code able written responses that included information regarding their work schedule, free lance evening interpreting work, and volunteer work such as interpreting for their local church. The responses ranged from 1 to 2 handwritten sentences to 2-3 pages of typed information. It

was not possible to obtain a comprehensive demographic picture of those that provided written responses versus those that did not (see Feuerstein, 1993 for a full description of demographic data).

Content Area I: Initiation or Exacerbation of Symptoms

The greatest impact on initiating or exacerbating symptoms were factors related to the type of job or task (32%) such as, long work hours with few or no breaks (15.7%), transliterating (word for word translating), fingerspelling (translating by spelling words out), or tactile interpreting for deaf and blind clients (6.9%), educational interpreting (e.g. undergrad and graduate college courses) (6.5%), and the difficulty of the assignment (4.6%). Factors external to the work environment were also implicated in developing or exacerbating symptoms (31%). These external factors included writing and/or typing (13.8%), outside activities such as moonlighting (included interpreter, waitress, etc), hobbies or other hand intensive behaviors (6.0%), and not exercising (3.6%). Complete results are presented in Table 3.

Content Area II: Response to Symptoms

Medical treatment was the most common response when an individual developed symptoms (45%). The most common medical treatments included wearing a splint, support, or brace (13%), medications including non-steroidal anti-

inflammatory drugs (10.4%), and physical therapy (5.3%).

Holistic and non-traditional medical treatment such as

acupuncture and acupressure (9.1%), chiropractic care (9.1%),

and massage (9.6%) were also popular and reported as

effective treatments in response to symptoms. Obtaining more

information about musculoskeletal disorders through various

organizations such as the Arthritis Foundation and the

National Technical Institute for the Deaf (5.3%) was also a

strategy used.

Changing or adjusting factors at work were also

reported as typical responses to symptoms (27%). Methods to

adjust work factors included reducing interpreting load by

lessening work or including a team interpreter (12.5%),

increasing control of the tasks and breaks during work

(9.4%), and taking time off to rest (7.1%). Reducing,

adjusting, or changing factors external to work such as

adjusting driving style/habits, avoiding activities that

cause hand and/or arm stress, and avoiding written or typing

tasks were reported as the least used response to the

development of symptoms (see Table 4 for complete list).

Content Area III: Prevention

The greatest prevention strategy (Table 5) reported

by individual interpreters was related to factors external

to the job (38%). These factors included exercise (9%), warm

up/stretching (5%), proper diet and hydration (4%), and signing since birth (3.5%). In relation to the actual work tasks and work environment, interpreting style (21%) and the job content and control of the work task (20%) were also reported as factors thought to be involved in prevention of symptoms.

Content Area IV: General Discussion of Symptoms and Treatment

There were 81 individuals (8%) that provided a response that included discussions of either their non-specific symptoms and/or treatment experiences (Table 1).

Inter and Intra Rater Reliability

The overall inter-rater reliability for Initiation or Exacerbation of Symptoms was strong at 91% agreement as was the intra-rater reliability at 94%. Reliability of Response to Symptoms was acceptable with 82% agreement as was intra-rater reliability at 88% overall. The overall inter-rater reliability for Prevention Methods of 87% and intra-rater reliability of 90% were both satisfactory. The overall intra-rater reliability of Discussion of Treatment or Symptoms was acceptable at 94% and intra-rater was 96%. None of the inter rater reliability for the individual categories were below the acceptable level of 70%, while most (13 out of 19 categories) exceeded the desired 85% reliability

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threshold ((Shaughnessy & Zechmesiter, 1985). Individual categories of inter- and intra-rater reliability percentages are provided in Table 6.

Discussion

The goal of this study was to confirm the factors found to be associated with sign language interpreters by Feuerstein and colleagues (1997), identify additional potential risk and protective factors not examined in the original study, and identify areas for future research. The results from the current study, while not identical to the original, seem to support much of the previously reported findings. The original study found that pressure at work was related to case status. In the current study, participants reported that work related factors such as the difficulty of the job, type of interpreting setting, and emotional and physical stress were all related to symptom development and exacerbation. However, in both of these studies these risk factors were obtained from subjective reports. Prospective and experimental studies will be required to examine the causality of these risk factors.

Feuerstein and colleagues (1997) also found that those that engaged in what was referred to as high risk Workstyle (Feuerstein et al., 1997; Feuerstein, 1996) were more likely to have symptoms. Similar results from this

study indicated that the interpreting style a person uses could impact symptom development. More specifically body posture and a relaxed style were associated with prevention and a common response to symptom development. It is not clear however; whether the individual's interpreting style is a direct result of their work demands, as implied by the Workstyle construct (Feuerstein, 1996), and prospective studies need to be conducted to confirm this. While work demands and perceived job control were implicated in symptom development, this study is not capable of determining any type of relationship between these two factors and is an area of future research.

The current study allowed for the examination of factors that individuals use to prevent the occurrence of symptoms and how they respond to the development of symptoms. Additionally, the current study provided information regarding limitations of the original study.

<u>Exercise</u>

One of the most common prevention methods reported by the interpreters was exercise. Exercise was also one of the common responses to symptoms, while not exercising was pointed to as casual of symptoms in a few cases (3.6%). However, a small subset (1.2%) indicated that exercise contributed to the development of their symptoms. It was

unclear in most of these cases if this exercise was related to sports or other injuries incurred while exercising or if exercise exacerbated existing symptoms. In general these results seem to support certain types of exercise (e.g. swimming, stretching, aerobic, light weight lifting but not heavy anaerobic training) as a useful method to improve symptoms and possibly as a protective factor. This finding is in keeping with current literature (e. g. Hanada, 2003) that supports the rehabilitative use of exercise. In these disorders evidence regarding the efficacy of exercise as a protective factor however, has been equivocal. A major review of musculoskeletal disorders (NRC, 2001) reported mixed results for the protectiveness of exercise. However, most of the studies examined in this review were based on either sports related injuries or back-specific pain. At least one study has examined the usefulness of an exercise program in the work place (Silverstein, Armstrong, Longmate, & Woody, 1988). Silverstein and colleagues evaluated a one-year exercise program in a dental floss plant. They found no statistically significant differences between those who participated in the exercise program compared to those who did not in regards to neck and/or shoulder discomfort. There was a trend though for those in the exercise program to report improvement in discomfort in these regions. As a

treatment factor, Feuerstein and colleagues (1999) conducted a review of several treatments for carpal tunnel syndrome (CTS) including physical therapy. Their review suggests that limited exercise may be more beneficial than rest or splinting, at least for CTS. In the current study it was impossible to determine exact numbers of sufferers with back pain versus upper extremity symptoms. However exercise as a treatment response or for prevention of back pain was infrequent and most exercise comments focused on upper extremity symptoms.

In a more recent study Strazdins and Bammer (2004) found that women have significantly less time to relax and exercise than men and this vulnerability factor was significantly associated with upper body musculoskeletal symptoms. Their findings are in keeping with previous research showing that females who work outside the home have increased stress levels and stress related neuro-hormonal levels including norepinephrine, epinephrine, and cortisol (see Lundberg, 2002 for review) relative to their male counterparts. While these studies did not directly examine the protective factors associated with exercise it does identify some hypotheses why women may be at greater risk for musculoskeletal disorders. Women with less time due to unpaid work demands may either not be able to "burn off"

stress induced muscle tension and catecholamines or are unable to obtain sufficient rest for recovery to normal levels and repair of muscles tears (Lundberg, 2002).

These findings are important in sign language interpreters who are mostly female. The risk associated with lack of time for exercise and relaxation may also be, in part, due to domestic demands on women such as child care (Strazdins & Bammer, 2004; Gerr et al., 2002). Future studies need to examine possible protective factors associated with exercise programs and recovery time in the development of upper extremity disorders and symptoms.

Coping Strategies

It is interesting that while sign language interpreters indicate factors related to work as "causal" of symptoms, prevention of and response to symptoms seemed to focus more on external factors such as self care (exercise, diet, warm up prior to interpreting) and medical treatment. This outcome seems to support the sense in many of the responses that some individuals utilize a more personal active coping strategy while others use a more passive approach after development of symptoms. In one study, Grahn, Stigmar, and Ekdahl (2001) found that patients with prolonged musculoskeletal disorders (mostly back, neck, or shoulder pain) who were classified as highly motivated used

more active and successful coping strategies, applied an internal locus of control, had improved level of self-focus, and better postural control than those that were classified as moderately motivated or latently motivated. Moderately motivated was defined as those "who expect the medical treatment to reduce their difficulties" while latently motivated was defined as those "who can only see impediments" to treatment. These patients also reported better outcomes during the two-year follow up than moderate and latent motivated patients. Vogelsang and colleagues (1994) found a similar association between carpal tunnel syndrome (CTS) and self-efficacy, as measured by the Lifestyle Approaches (LSA; Williams, Moore, Pettibone, & Thomas, 1992). Participants in this study with CTS tended to have significantly lower self-efficacy scores than those without CTS. Self-efficacy combined with a generic musculoskeletal problems scale accurately predicted case status 72% of the time and incorrectly predicted group membership only 27% (Vogelsang, Williams, Lawler, 1994). Future research needs to take into account coping style and motivation level in response to development, exacerbation, and maintenance of musculoskeletal disorders.

Complementary Alternative Medicine

Holistic and non-traditional medical treatments were reported as useful alternatives to traditional treatments. Acupuncture, acupressure, chiropractic care, and massage were all listed as treatments that provided varying levels of relief. Based on the comments it seems that some of these treatments are individually useful or may be more beneficial for some disorders than others. Since the actual location of symptom was not able to be determined from the current analysis this would be useful for future research to examine.

It is interesting to note the comparison of complementary alternative medicine (CAM) utilization among interpreters to surveys of the general population. In the current study utilization of acupuncture, chiropractic care, and massage treatment was reported around 9%. Eisenberg and colleagues (1998) found similar levels of chiropractic utilization (11%) and massage therapy (11.1%) in 1997 as the current study. However, in sharp contrast to the current study, Eisenberg and colleagues (1998) reported only 1% utilization of acupuncture as a treatment method in 1997. In this utilization study it was reported that back and neck problems, arthritis, and sprains and strains were more likely to be treated by chiropractic care. In the current study however, patients reported using chiropractic care for upper extremity symptoms as well.

Acupuncture is an alternative treatment source that was used by a subset of interpreters. Evidence for the efficacy of this treatment for musculoskeletal symptoms has been equivocal. Hanada (2003) reported on various uses of acupuncture in treating various disorders. He reported that in some cases acupuncture might reduce pain associated with osteoarthritis of the knee and low back pain but not in patients with rheumatoid arthritis. The National Institute of Health's Consensus Conference on Acupuncture (1997) reported that it might be an efficacious treatment for tennis elbow, fibromyalgia (general muscle pain), low back pain, and carpal tunnel syndrome. This treatment method as well as other forms of CAM still require clinical trials to determine their efficacy in the treatment of musculoskeletal disorders, especially those of the upper extremities for which little research has been done to date.

Cooper and McKee (2003) suggest that one of the benefits associated with alternative medicine treatments is the experience. Patients of alternative medicine treatment providers consistently reported greater satisfaction with their care than other forms of treatment. These encounters include sensitivity to the patient as an individual, effective communication, and a holistic approach to health and disease. A subset of participants from the current study

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felt compelled to write about their experiences of symptoms and/or treatment even though writing increased or caused pain and discomfort. This finding seems to suggest that there are some sign language interpreters who might benefit from the individualized treatment and an opportunity to discuss their experiences with their provider that are part of complementary alternative medicine.

Treatment experience

Almost 8% of participants reported on their history of symptoms and or treatment, even though they were not directly asked this on the question and in spite of the fact that many reported pain due to writing. It seems that they felt it was important for someone to understand their situation at the expense of increased discomfort and pain. While the current study did not directly examine these reports of their symptoms or experience with treatment they seem to be in keeping with Reid and colleagues' (1991) findings. In this study the authors found that women with repetitive stress injuries, employed in either telecommunications or chicken processing industries, had a difficult time finding medical care providers who would believe their symptoms and illness reports and provide them with caring treatment (Reid, Ewan, Lowy, 1991). Similarly many of these women sought out or were referred to CAM

providers who were better able to provide treatment that considered the 'whole' person (Reid, Ewan, Lowy, 1991).

Biomechanical Factors

In the current study, team interpreting was reported as an "effective" method for preventing or reducing symptoms. The consensus appeared to be that rotating interpreters every 20-30 minutes proved beneficial in preventing or reducing symptoms. These reports suggest that there may be an optimal exposure time to prevent symptoms or further injury. This finding is in line with the conceptual model of work-related neck and upper-limb musculoskeletal disorders proposed by Armstrong and colleagues (1993). In this model exposure to, and amount of, external factors (e. g. vibration, force required) create internal disturbances such as tissue forces that contribute to symptom development. Armstrong and colleagues (1993) proposed their model as a way to aid researchers in identifying dose and response variables in their studies. While further research is required to determine optimum dosing, or time spent interpreting, the current study provides a foundation for controlled studies regarding time exposure to interpreting tasks.

Previous research has also indicated that repetition, force, mechanical stress, posture, low temperature, and

vibration are related to development of upper extremity disorders (Latko, Armstrong, Franzblau, Ulin, Werner, & Albers, 1999). However, Latko and colleagues (1999) found that only repetition was associated with upper extremity disorders when the other factors were also considered. Although awkward posture and repetitive motion are present in sign language interpreting, it is important to emphasize that this work does not involve external forces (such as tools or keyboard), external mechanical stressors, or exposure to vibration. While there were complaints regarding cold workspaces, future research is required to determine whether office temperature is a contributing factor in development or exacerbation of symptoms. Feuerstein and Fitzgerald (1992) found that interpreters who used a fast paced interpreting style, took shorter rest breaks during the task, had more deviations from neutral (flexing or extending of wrist beyond 24%), and worked outside the optimal work envelope were more likely to report pain than those without pain. To date there have been no further investigations of exposure time, interpreting speed, and other ergonomic factors associated with the interpreting field.

Future Research

There are three areas that future research can focus on; primary, secondary, and tertiary prevention. In the area of primary prevention, potential factors include the use of exercise, ergonomic factors such as maximum and minimum exposure times, relaxing while interpreting, and administrative controls such as requiring team interpreters, break time, and alternate between types of jobs. Many individuals also indicated that they experience pain in interpreting situations but they often do not in social circumstances, which may imply performance stress may play some role. Secondary and tertiary treatments that should be examined include the use of complementary alternative medicine such as chiropractic care, acupuncture, massage therapy, and relaxation techniques such as progressive muscle relaxation. Tertiary treatments should also focus on rehabilitation and other employment opportunities in which the interpreter will still be able to obtain their sense of worth.

Other notable factors include the need of some sign language interpreters to feel compelled to write about their experiences with symptoms, treatment, or both even though it may cause discomfort and pain. Writing about their experiences may also be one method of potential treatment. The use of writing as a treatment has been shown to be

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effective for reducing symptoms in a variety of disorders and has been reported to reduce stress responses including neuroendocrine and cardiovascular measures (see Lepore & Smith, 2002 for a review).

There also seems to be a personal desire to help others and stay at work despite pain. As one participant stated "I could skip work without him (boss) ever seeing or noting my absence. The only supervision of my work are the children and my desire to do my best" and "I am constantly aware that if I am not working, some child is missing accurate transliteration". These comments seem to indicate that in many of the interpreters there is a strong desire to be available regardless of personal health. This desire to work regardless of pain is likely to exacerbate symptoms by not allowing the individual adequate rest and recovery time (Feuerstein, 1997; Feuerstein, Huang, & Pransky, 1999).

Two participants who indicated they had symptoms reported an interesting finding that is very indicative of quantitative research. Both, independently, purchased and began riding motorcycles; after a short time their pain symptoms disappeared. This outcome seems contrary to previous research that implicated the casual role of machine vibration in musculoskeletal disorders (Hagberg, 2002) and is another area for future research.

<u>Limitations</u>

There are several important limitations with this study. This study is not a true quantitative study in the traditional sense. The open-ended question was part of a broader study to examine prevalence and risk factors of musculoskeletal symptoms in sign language interpreters. As such it was not possible to ask additional questions or follow up on issues introduced by participants. The current study relied on self-report qualitative data, limiting the ability to provide exact relationships between factors implicated as protective, causal, or aiding in the treatment of musculoskeletal symptoms and disorders.

As part of a forced choice questionnaire there is a possibility that responses to the open-ended question could be impacted by the proceeding questions or respondents only providing new information. While the current study is not directly comparable to the original (Feuerstein et al., 1997), it is possible to compare some of the medical treatment data to examine this concern. In the current study 10.35% of subjects reported using medication compared to 70% in the original study. The use of a wrist brace was reported by 46.5% in the original survey while only 13% reported the use of some type of wrist brace or splint. Results are similar in other areas in that questions asked in the

original study tended to be under-reported in the current study such as stress and pain management (24.4% vs. 7.06%) and changing work schedule (21.2% vs. 12.45%). While the current study appears to be under-reporting outcomes from the original survey it is apparent that new data in areas of focus not in the original study have also been added. These new areas include the use of complementary alternative medicine and arthritis as both an outcome and risk factor. These results suggest that both the cognitive mindset and new factors are both issues in the current study but not to a level that would indicate one factor is more involved than the other. In other words individuals do not appear to have been unduly influenced by the original questions and did indeed provide their individual views regarding risk and prevention factors. Additionally, participants reported on how they responded to symptoms and the various treatments that are utilized when symptoms develop, which were not included in the original survey (appendix A).

Summary

In summary, this study found that sign language interpreters implicate a variety of risk factors in the development and exacerbation of symptoms. They also utilize a variety of responses including several alternative treatment methods to alleviate pain or prevent further

occurrences of symptoms. Methods to prevent symptoms were also identified by sign language interpreters including team interpreting, alternating between difficult and simpler jobs, and requiring break times at specific intervals. New findings that have not previously been identified in the research from this study included the use of complementary alternative medicine, the possible preventative use of exercise in upper extremity disorders, a starting point for exposure levels to interpreting situations (20-30 minutes), and ensuring that the whole person is treated and not just the symptoms. Future, well-controlled, epidemiological and prospective studies will be required to determine the actual causality or usefulness of these various factors.

Table 1: Overall Categories, raw scores, and percentages

Initiation or Exacerbation of Symptoms		
Sub-category	Number of Yes Responses	Percent of category
Interpreting style	182	12%
Job content/task	465	30%
Job Control	213	14%
Ergonomic factors	137	9%
External factors	439	28%
Medical	134	9%
Training Factors	4	0%

Response to Symptoms		
Adjust/Change Interpreting style	244	12%
Medical Treatment	720	35%
Adjust/Change work task	572	28%
Adjust/Change external factors	191	9%
Exercise	306	15%

Prevention Factors		
Interpreting style	181	20%
Job Control	95	10%
Job content/Work task	178	19%
Work Method	53	6%
Relaxation	97	11%
External factors	314	34%

General discussion of treatment or symptoms *	81	7%

Notes: There was no limit on number of responses and therefore participants may have responded in more than one category and/or subcategory.
* Individuals only contributed one response to General discussions of treatment.

Table 2: Number of participants with multiple responses

Total Number of Responses	Initiation or Exacerbation of Symptoms	Response to Symptoms	Prevention Factors	General Discussion of treatment or symptoms
1	55	35	35	1
2	163	135	79	11
3	207	199	98	12
4	182	245	132	9
5	261	287	133	14
6	171	242	118	9
7	118	218	70	7
8	149	204	64	7
9	51	102	44	1
10	61	106	37	6
11	30	71	30	1
12	29	69	21	1
13	25	29	24	0
14	34	29	5	2
15	14	25	6	0
16	19	21	8	0
17	0	4	13	0
18	5	12	1	0
Totals	1574	2033	918	81

Table 3: Initiation or Exacerbation of Symptoms

	Initiation or Exacerbation of Symptoms		
	Work related factors	**Number of Yes Responses**	**Percent**
Interpreting Style	Poor body posture when signing	48	4.40%
	Tensing muscles when interpreting	30	2.75%
	Perfectionist attitude	21	1.92%
	Work through/with pain	19	1.74%
	Signing too forcefully	15	1.37%
	English style interpreting	13	1.19%
	More effort than necessary	12	1.10%
	Failing to maintain neutral signing positions	9	0.82%
	Too large of a signing space	8	0.73%
	Small signing space	6	0.55%
	Jerky or fast motions	3	0.27%
Job Content/Task	Long work hours/no breaks	171	15.66%
	Transliterating/fingerspelling/Tactile	76	6.96%
	Educational interpreting/board or business meetings	71	6.50%
	Any Interpreting	62	5.68%
	Difficulty of assignment	50	4.58%
	Insufficient amount of breaks/time btwn breaks	20	1.83%
	Interpreting for fast speakers	15	1.37%
	First in assignment/position	4	0.37%
	Interpreting for therapy sessions	3	0.27%
	Voice to sign interpreting with little sign to voice (voicing)	2	0.18%
Job Control	Emotional/physical stress	70	6.41%
	Economic difficulties/lack of benefits/pressure to continue	34	3.11%
	Increased workload/work pressure	12	1.10%
	Overwork	11	1.01%
	Anxiety regarding job	6	0.55%
	Boredom	3	0.27%
	Fear of asking for a break	3	0.27%
	Disliking job	1	0.09%
	Low autonomy work place	1	0.09%
	Lack of control/feel powerless	21	1.92%
	Stress/tension from job/supervisor	29	2.66%
	Booking too many jobs back to back	8	0.73%
	Stressful working condition	8	0.73%
	Feeling un-appreciated	7	0.64%
Ergonomic Factors	Poor seating/chair	48	4.40%
	Standing while interpreting	35	3.21%
	Temperature of work environment	25	2.29%
	Extended sitting	25	2.29%
	Phone Interpreting	4	0.37%

Continued on next page

Table 3: Initiation or Exacerbation of Symptoms (Continued)

	Initiation or Exacerbation of Symptoms		
	Personal factors	**Number of Yes Responses**	**Percent**
External Factors	Writing/typing	151	13.83%
	Outside activities that can contribute (employment, hobbies, chopping food etc)	66	6.04%
	Driving	45	4.12%
	Not exercising	39	3.57%
	Heavy lifting/weight lifting/carrying objects (purse)	30	2.75%
	Insufficient sleep/poor sleep posture/position	26	2.38%
	Children	21	1.92%
	Overweight	17	1.56%
	Age	16	1.47%
	Exercise	13	1.19%
	Not stretching prior to signing	10	0.92%
	Other use of hands (push doors, remote control, etc)	7	0.64%
	Poor diet	6	0.55%
	Caffeine	4	0.37%
	Smoking	2	0.18%
	Walking dog	1	0.09%
Medical	Acute trauma	43	3.94%
	Arthritis	27	2.47%
	Illness	24	2.20%
	Delay seeking treatment	18	1.65%
	Pregnancy	11	1.01%
	Phases of the moon (time of month)	3	0.27%
	Thinking about pain	1	0.09%
Training Factors	Training as an adult	3	0.20%

Notes: There was no limit on number of responses and therefore participants may have responded in more than one category and/or subcategory.

Table 4: Response to symptoms

	Work related factors	Number of Yes Responses	Percent
Response to Symptoms			
Interpreting Style	Awareness of body position	48	4.40%
Adjust/Change	Relaxing while interpreting	38	3.48%
	Alternate seating, standing	26	2.38%
	Use ASL signing / decrease transliterating	24	2.20%
	Reduce effort	20	1.83%
	Maintain natural hand/wrist positions	19	1.74%
	Work through the pain	18	1.65%
	Stop signing with dominate hand/Use other hand for signing	13	1.19%
	Eliminate "useless" info/abbreviate	13	1.19%
	Increasing lag time	10	0.92%
	Avoid educational interpreting	7	0.64%
	Moderation of activity/frequent breaks	4	0.37%
	Prop up arms/legs	4	0.37%
Work Task	Reduce work load/team interpret	136	12.45%
Adjust/Change	Increase control of task or time off/breaks	103	9.43%
	Time off/Rest	77	7.05%
	Find new job/change employment positions/quit	69	6.32%
	Make ergonomic adjustments (office, sleeping, etc)	59	5.40%
	Reducing stress (arrive early/prepare)	28	2.56%
	Work part time	22	2.01%
	Take breaks when possible	20	1.83%
	Vary work load (heavy class to light class)	17	1.56%
Personal Factors			
Medical Treatment	Wrist supports/splints/braces	142	13.00%
	Medication	113	10.35%
	Massage	105	9.62%
	Acupuncture/pressure	99	9.07%
	Chiropractic care	99	9.07%
	Ice or heat	84	7.69%
	Physical therapy	58	5.31%
	Workshops and literature about sx by RID and arthritis foundation	58	5.31%
	Hot baths/Showers	36	3.30%
	Surgery	23	2.11%
	Combo chiro/acupressure/puncture	14	1.28%
	Seek medical treatment after all else fails	14	1.28%
	Seek immediate treatment	13	1.19%
	Biofeedback/Relaxation	5	0.46%
	Psychological treatment (hypnosis, relaxation)	4	0.37%
External Factors	Avoid activities that cause hand/arm stress (hobbies)	92	8.42%
Adjust/Change	Decrease/eliminate outside physical activity (such as moving or lifting heavy items)	32	2.93%
	Avoid written/typing tasks	28	2.56%
	Not drive/adjust driving habit	19	1.74%
	Seek social support	8	0.73%
	Comfortable shoes	5	0.46%
	Reduce time with deaf community	5	0.46%
Exercise	Exercise	131	12.00%
	Warming up muscles in advance	81	7.42%
	Yoga – stretching	69	6.32%
	Relaxing and cooling muscles after tasks	19	1.74%
	Shake hands out when begin hurt/tingle	7	0.64%

Notes: There was no limit on number of responses and therefore participants may have responded in more than one category and/or subcategory.

Table 5: Prevention Methods

Prevention Methods			
	Work Related Factors	**Number of Yes Responses**	**Percent**
Interpreting Style	Stay relaxed	45	4.12%
	Use natural breaks or require breaks	36	3.30%
	Learn to work naturally/awareness of body position	32	2.93%
	Stretching during breaks	16	1.47%
	Natural smooth movements	13	1.19%
	Take time interpreting/Lag Time	8	0.73%
	Natural signing space	8	0.73%
	Pace interpreting speed	6	0.55%
	Switching to non-dominant hand to rest dominant hand	6	0.55%
	Take time to process and keep hands neutral or in lap until ready	5	0.46%
	Reducing signing space	3	0.27%
	Avoid crisp signing style	1	0.09%
	Co-articulation (signing with both hands) increase efficiency	1	0.09%
Job Control	Control over schedule/work	59	5.40%
	Balance work load	17	1.56%
	Learning prevention strategies	16	1.47%
Job Content/	Team interpreting for long jobs	59	5.40%
Work Task	Enjoying work/staying interested	26	2.38%
	Voicing time	20	1.83%
	Referral agency's policies (2 for 2 hour jobs, not sched continuously, requiring breaks)	17	1.56%
	Breaks in schedule	16	1.47%
	Prepare for job before arrival	15	1.37%
	Not transliterating/English style interpreting/Not fingerspelling	6	0.55%
	Limit educational interpreting	4	0.37%
	Knowledge of topic	3	0.27%
	Use decoder for closed captioned films rather than interpret them	3	0.27%
	Agencies awareness of ergonomic factors	3	0.27%
	Use written methods to provide information when possible to limit signing	2	0.18%
Method	Ensuring comfort during interpreting sessions	44	4.03%
	Use support (Brace, desk, etc)/comfort items while interpreting	8	0.73%
	Personal Factors		
Relaxation	Relaxation techniques (deep breathing, pmr, etc)	36	3.30%
	Manage stress	32	2.93%
	Full body Massage	11	1.01%
	Hot tub/sauna	6	0.55%
External Factors	Exercise	94	8.61%
	Stretching/Warm up	54	4.95%
	Proper diet/hydration	46	4.21%
	Signing since birth/CODA	38	3.48%
	Proper rest	22	2.01%
	Vitamin B complex	21	1.92%
	Minimize external force on hands (push doors w/shoulder, not shaking hands, etc)	20	1.83%
	Performing crafts/hobbies: sewing, cross stitch, crocheting, etc (keeps fingers limber; strengthens wrists) *	12	1.10%
	Multivitamin	11	1.01%
	Social support	9	0.82%

Notes: There was no limit on number of responses and therefore participants may have responded in more than one category and/or subcategory.

Table 6: Inter and Intra Rater Reliability

Category	Inter rater	Intra rater
Initiation or Exacerbation of Symptoms		
Interpreting style	92%	98%
Job content/task	85%	92%
Job Control	91%	92%
Ergonomic factors	89%	94%
External factors	79%	87%
Medical	98%	92%
Training Factors	100%	100%
Initiation or Exacerbation Reliability	91%	94%
Response to Symptoms		
Adjust/Change Interpreting style	81%	89%
Medical Treatment	87%	87%
Adjust/Change work task	72%	81%
Adjust/Change external factors	85%	92%
Exercise	85%	89%
Response Reliability	82%	88%
Prevention Methods		
Interpreting style	83%	89%
Job Control	92%	92%
Job content/Work task	87%	85%
Work Method	96%	98%
Relaxation	79%	89%
External factors	85%	87%
Prevention Total Reliability	87%	90%
Discussion of treatment or symptoms in general	94%	96%
Overall total agreement	88%	92%

APPENDIX A

Original Survey of Interpreters for the Deaf

R·I·T

Dear Interpreter:

We are asking all certified and associate members of the Registry of Interpreters for the Deaf to please take the time to participate in an important national study to investigate work-related injuries in sign language interpreters.

The enclosed survey was developed in response to a growing concern in the field of sign language interpretation regarding work-related upper extremity problems. This concern was first expressed in 1985 at the RID convention in San Diego and has been followed by a number of articles in several journals including the *Journal of Interpretation, the Journal of Occupational Medicine*, and *American Annals for the Deaf*. Many of us have experienced upper extremity problems or know colleagues that have developed debilitating conditions which have necessitated leaving the field to avoid the pain experienced when using sign language.
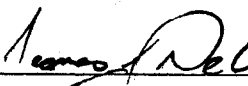
Although at first glance the enclosed survey looks long, it should take less than 30 minutes of your time to complete. **Your individual responses will be kept confidential.** We do plan to follow up with those individuals who have not responded within a reasonable amount of time. Please identify yourself on the questionnaire to ensure that you do not receive more than one copy of this survey.

In addition to providing valuable information regarding health problems affecting many sign language interpreters, your participation will make you eligible for a $300 cash drawing to be held on November 30th, 1992.
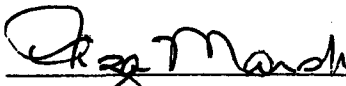
In order to be eligible for the drawing, we must receive both the completed survey and the lottery form by November 30th, 1992.

Thank you in advance for your assistance.

Sincerely,

James P. DeCaro, Ph.D.
Dean and Professor
NTID at RIT

Michael Feuerstein, Ph.D.
Director, Center for
Occupational Rehabilitation

Liza Marshall, CSC, OIC
Director, Interpreting Services
NTID at RIT

REPETITIVE MOTION DISORDERS WITHIN THE INTERPRETING PROFESSION
A National Survey

Repetitive motion disorder is a generic name for a group of disorders affecting individuals whose professions require constant and repeated use of certain muscle groups. Data processors, professional athletes, and meat packers are among the groups frequently found to have symptoms of repetitive motion disorder. Recently, a dramatic increase in the number of sign language interpreters on partial or complete disability due to repetitive motion disorder symptoms of the upper extremities has been noted at several institutions. We are asking you to complete the following questionnaire to help researchers at Rochester Institute of Technology (the host institution for the National Technical Institute for the Deaf) and the University of Rochester determine the extent and severity of this condition within the interpreting profession.

It is important that you fill out this survey whether or not you have symptoms. For those of you without symptoms, the information you provide may help prevent the development of the problem. Please take the time to complete this questionnaire and mail it back to the researchers in the enclosed envelope. **All your answers will remain confidential and will be used for research purposes only.**

Thank you for helping with this important project. **If you return the completed questionnaire with the attached lottery entry form, you will be eligible for a $300 cash drawing to be held on November 30, 1992.**

I understand the purpose of this survey and its confidentiality, and agree to be a participant.

(Signature) _____

_____

Throughout the questionnaire, you will be asked to respond to 0 - 5 point scales like the one below. Please respond by placing an "X" through the line in the location that best describes your response to the question or statement, as shown in the example below.

```
|-------|-------|-------|-------|---X---|
0       1       3               5
Not at All  Mildly      Moderately   Highly Anxious
```
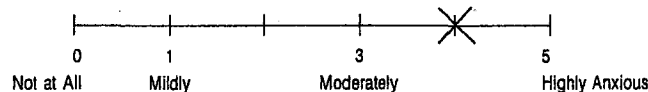
I. BACKGROUND INFORMATION

1. Name _____

   Address _____

   _____

   _____

   _____

2. Date of Birth: (Month/Day/Year) _____/_____/_____

3. Gender: ☐ Female   ☐ Male

4. How many years have you been interpreting professionally (for pay)? _____ Years

5. Did you receive formal training as an interpreter? ☐ Yes ☐ No

   If Yes, where and when did you receive training?

   When _____

   Where _____

6. Are you certified by the Registry of Interpreters for the Deaf or another certification agency?   ☐ Yes   ☐ No

   If Yes, please indicate the type of certification you hold:

   _____

7. Please list your employer(s). Many interpreters work for more than one agency or organization. If this describes your situation, please list your two primary employers.

   _____

   _____

8. How many other interpreters are employed by the same organization, institution or referral service as your primary employer?

   _____ Number of other interpreters

9. Please indicate the **percentage of your time (%)** you spend interpreting in each of these types of work environments.

   _____ % Educational institution
   _____ % Health care institution
   _____ % Private referral service
   _____ % Public referral service
   _____ % Business/industry
   _____ % Self-employed
   _____ % Other (please describe) _____

10. Please indicate the **percentage of your time (%)** you spend interpreting in each of these interpreting situations.

    _____ % Platform
   _____ % Workshops or meetings
    _____ % Classroom
   _____ % One on one interpreting
    _____ % Other (please describe) _____

11. In the past year, on the average, how many hours did you **interpret** during a work day? (If you work in a school setting, indicate the average number of hours you work per day during the school term.) _____ Hours per day

12. In the past year, on the average, how many hours did you **interpret** each week? (If you work in a school setting, indicate the average number of hours you work during the school term.)

    _____ Average number of hours per week

13. Please estimate the **total number of weeks** you **interpret** per year. _____ Total number of weeks per year

14. On the average, how long is your typical interpreting assignment?
    _____ Minutes _____ Hours

15. How long do you typically interpret during an assignment before you take a break?

    _____ Number of continuous minutes
    _____ Number of continuous hours

16. When you do take a break during an assignment, how long is your typical break? _____ Number of minutes

17. How much control do you feel you have over the hours you work each week?

    ```
    |----+----+----+----+----|
    0    1         3         5
    No control  Slight   Moderate   Total Control
    ```
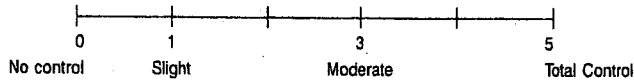
18. How much control do you feel you have over your typical interpreting assignment?

    ```
    |----+----+----+----+----|
    0    1         3         5
    No Control  Slight   Moderate   Total Control
    ```
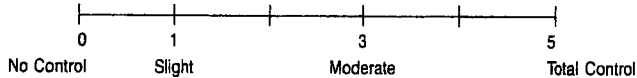
II. WORK STYLE

Please provide an estimate of your typical work style during a typical interpreting assignment **as you defined it** in question 14.

19. How anxious do you feel just before a **typical** interpreting assignment?

    ```
    |----+----+----+----+----|
    0    1         3         5
    Not at All  Mildly   Moderately   Highly Anxious
    ```
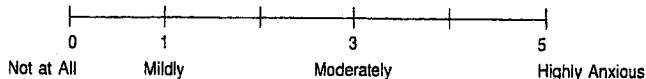
20. How anxious do you feel just before a **highly demanding** interpreting assignment?

    ```
    |----+----+----+----+----|
    0    1         3         5
    Not at All  Mildly   Moderately   Highly Anxious
    ```
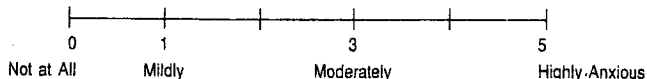
21. To what extent do you pause during a typical interpreting assignment?

    ```
    |----+----+----+----+----|
    0    1         3         5
    Not at All  Rarely   Sometimes   Very Frequently
    ```
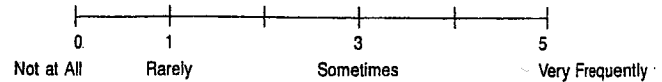
22. When signing while seated, how frequently do your hands/wrists/forearms extend beyond a signing area "box" three inches in front of your body, and approximately 10 inches x 10 inches? (Please do not confuse this "box" with your normal signing space.)

    ```
    |----+----+----+----+----|
    0    1         3         5
    Not at All  Rarely   Sometimes   Very Frequently
    ```
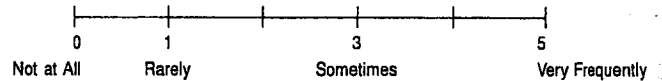
23. How frequently do you hit your hands together with enough force to create an audible sound?

    ```
    |----+----+----+----+----|
    0    1         3         5
    Not at All  Rarely   Sometimes   Very Frequently
    ```
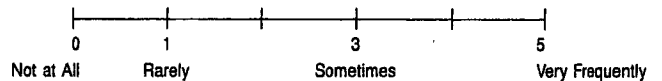
24. How frequently do you find your fingers/hands/arms moving "as fast as they can go?"

    ```
    |----+----+----+----+----|
    0    1         3         5
    Not at All  Rarely   Sometimes   Very Frequently
    ```
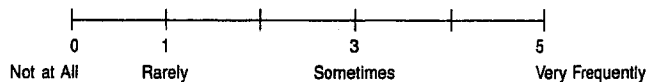
25. How frequently do you find your fingers/hands/arms making jerky, forceful movements?

    ```
    |----+----+----+----+----|
    0    1         3         5
    Not at All  Rarely   Sometimes   Very Frequently
    ```
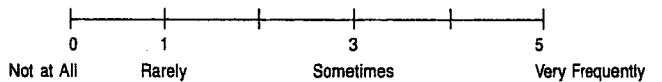
26. To what extent do your **hands and wrists** deviate from neutral positions during a typical interpreting assignment? (Please use the definition **of hand/wrist** neutral orientation shown in the illustration below.)

    ```
    |----+----+----+----+----|
    0    1         3         5
    Not at All  Rarely   Sometimes   Very Frequently
    ```
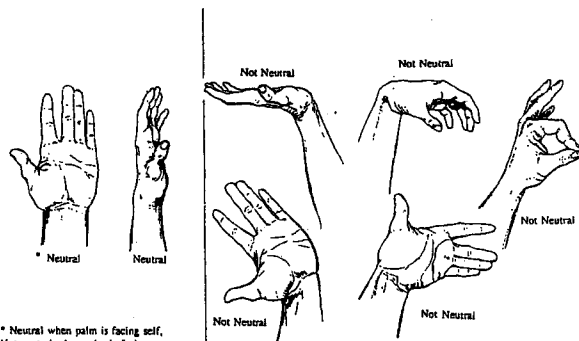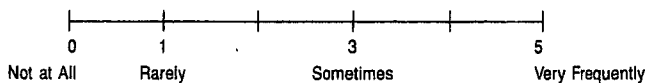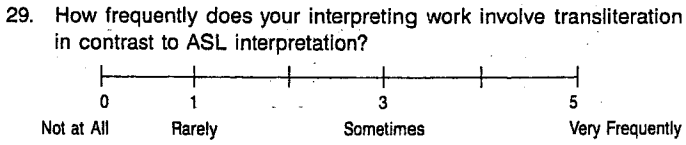

* Neutral when palm is facing self,
Not neutral when palm is facing consumer.

27. How frequently does your interpreting work involve voicing?

    ```
    |----+----+----+----+----|
    0    1         3         5
    Not at All  Rarely   Sometimes   Very Frequently
    ```
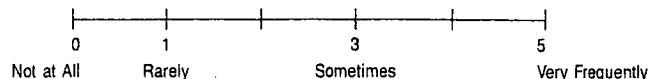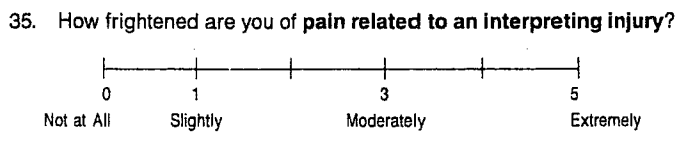
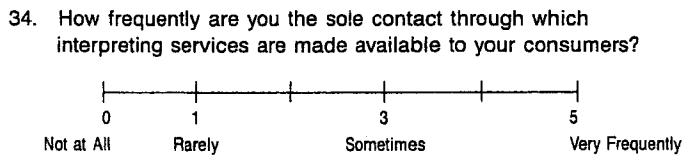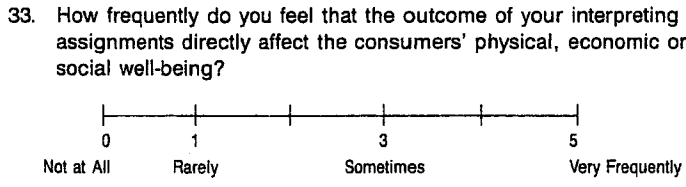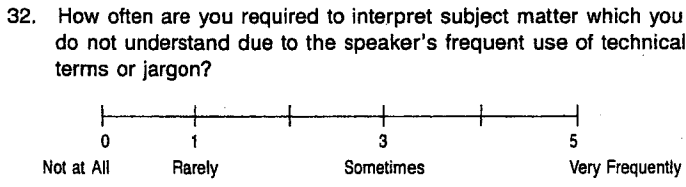28. Please indicate your most comfortable signing style. (Check one)

    a. _____ ASL-like
    b. _____ English-like
    c. _____ Fingerspelling
    d. _____ Other (please specify) _____

29. How frequently does your interpreting work involve transliteration in contrast to ASL interpretation?

```
|----+----+----+----+----|
0    1         3         5
Not at All  Rarely   Sometimes   Very Frequently
```

30. In a typical assignment, please indicate the percentage of time you use each of the following signing styles.

    a. _____ % ASL interpretation
    b. _____ % English-like
    c. _____ % Fingerspelling
   d. _____ % Other (please specify) _____

31. How would you describe your processing time—how far you tend to stay behind the speaker?

    _____ Less than two words
    _____ Two words
    _____ Between two words and one sentence
    _____ One sentence
    _____ One and a half sentences
    _____ More than one and a half sentences

32. How often are you required to interpret subject matter which you do not understand due to the speaker's frequent use of technical terms or jargon?

```
|----+----+----+----+----|
0    1         3         5
Not at All  Rarely   Sometimes   Very Frequently
```

33. How frequently do you feel that the outcome of your interpreting assignments directly affect the consumers' physical, economic or social well-being?

```
|----+----+----+----+----|
0    1         3         5
Not at All  Rarely   Sometimes   Very Frequently
```

34. How frequently are you the sole contact through which interpreting services are made available to your consumers?

```
|----+----+----+----+----|
0    1         3         5
Not at All  Rarely   Sometimes   Very Frequently
```

35. How frightened are you of **pain related to an interpreting injury**?

```
|----+----+----+----+----|
0    1         3         5
Not at All  Slightly  Moderately   Extremely
```

36. During a typical interpreting session, how preoccupied are you with accuracy and comprehension?

```
|----+----+----+----+----|
0    1         3         5
Not at All  Slightly  Moderately   Extremely
```
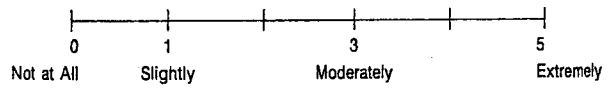
37. If seated during an interpreting assignment, how comfortable is your chair?

```
|----+----+----+----+----|
0    1         3         5
Not at All  Slightly  Somewhat   Very Comfortable
```
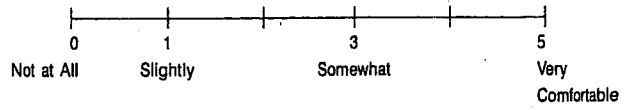
38. Rate the degree of physical exertion you believe is associated with a typical interpreting assignment (circle the corresponding number).

    0   Nothing at all
    0.5 Very, very easy
    1   Very easy
    2   Easy
    3   Moderately hard
    4   Somewhat hard
    5   Hard
    6
    7   Very hard
    8
    9
    10   Very, very hard

39. Rate the degree of physical exertion you believe is associated with a **highly demanding** interpreting assignment (circle the corresponding number).

    0   Nothing at all
    0.5 Very, very easy
    1   Very easy
    2   Easy
    3   Moderaly hard
    4   Somewhat hard
    5   Hard
    6
    7   Very hard
    8
    9
    10   Very, very hard

Here are some questions about your current job. The questions are intended to apply to all work environments. However, some words may not be quite suitable for your work environment. For example, the term supervisor is meant to refer to the boss, manager, department head, or the person or persons to whom an employee reports. For each question, please indicate how often these things happen (if the question is Not Applicable due to the nature of your work situation, please check NA):

> Note: If you don't have a supervisor, please place a check here _____.
>
> If you freelance the majority of the time you interpret, please place a check here _____.

	Never	Seldom	Some-times	Fairly Often	Often	NA
40. Do you talk with your fellow employees about your work problems?	_____	_____	_____	_____	_____	_____
41. Are your co-workers friendly toward you?	_____	_____	_____	_____	_____	_____
42. Does your supervisor criticize you over minor things?	_____	_____	_____	_____	_____	_____
43. Do you have conflicts with your co-workers?	_____	_____	_____	_____	_____	_____
44. Do you have conflicts with your supervisor?	_____	_____	_____	_____	_____	_____
45. Do you get adequate recognition for your contributions at work?	_____	_____	_____	_____	_____	_____
46. Is there constant pressure to keep working?	_____	_____	_____	_____	_____	_____
47. Are responsibilities at work clearly defined?	_____	_____	_____	_____	_____	_____
48. Is your work really challenging?	_____	_____	_____	_____	_____	_____
49. Does there seem to be a rush or urgency about everything?	_____	_____	_____	_____	_____	_____
50. Can you use your own initiative to do things?	_____	_____	_____	_____	_____	_____
51. Are there unpleasant physical conditions on your job, such as too much noise, dust, etc.?	_____	_____	_____	_____	_____	_____

IV. GENERAL MEDICAL QUESTIONS

This part of the questionnaire asks questions about the following body areas: neck, shoulder, elbow, forearm, low back, upper back, hand, and wrist. **All references to a job should be answered in relation to your work as a sign language interpreter.**

Neck
Shoulders
Upper Back
Elbows
Low Back
Wrists/Hands
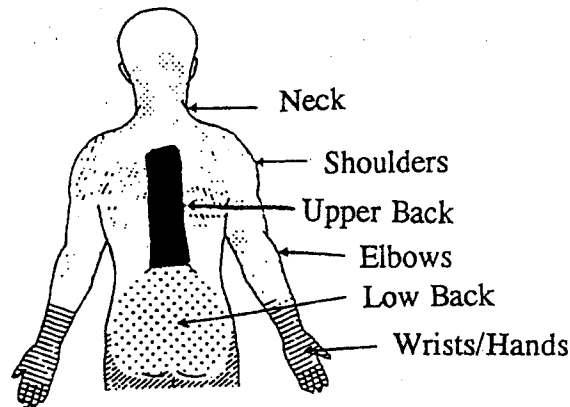
52. Have you ever been told by a doctor that you had tendonitis, tenosynovitis, carpal tunnel syndrome, thoracic outlet syndrome or bursitis in any of these areas? (Check any and all that apply; if you check "None" for each body part, please skip to **question 58**.)

neck	☐ left	☐ right	☐ both	☐ none
shoulder	☐ left	☐ right	☐ both	☐ none
elbow	☐ left	☐ right	☐ both	☐ none
forearm	☐ left	☐ right	☐ both	☐ none
hand/wrist	☐ left	☐ right	☐ both	☐ none

53. What was the length of time between the onset of any upper extremity symptoms and your seeking medical help?

☐ Have had no difficulties that needed medical help
   (skip to question 58)
☐ 0 - 1 months
☐ 1 - 2 months
☐ 2 - 3 months
☐ 3 - 4 months
☐ 4 - 5 months
☐ 5 - 6 months
☐ 6 - 12 months
☐ More than 1 year
☐ More than 2 years
☐ Have problems, but have never sought medical help **(skip to question 58 if no medical help was sought).**

54. Please check those diagnostic tests you have had completed for any hand, wrist, elbow, forearm, shoulder, or back problem and indicate date completed:

Date

☐ History and physical examination _____
☐ X-rays _____
☐ CT scans _____
☐ MRI _____
☐ Nerve conduction studies _____
☐ Needle electrode studies _____
☐ Blood vessel studies _____
☐ Arthrogram _____
☐ Other (please specify) _____
☐ Don't know

55. Please check all the following therapies you have had for any type of pain or other problem in your hands, wrists, arms, shoulders or neck:

55a. MEDICAL
   A. Nonsteroidal anti-inflammatory drugs
      (i.e., Feldene, ibuprofen) ☐
   B. Oral steroids ☐
   C. Local steroid injections ☐
   D. Antidepressants ☐
   E. Surgery (specify type and problem) ☐
      Type _____
      Problem _____
   F. Other (specify) _____

55b. PHYSICAL THERAPY
   A. Splinting ☐
   B. Muscle re-education ☐
   C. Transcutaneous nerve stimulation ☐
   D. Untrasound ☐
   E. Traction ☐
   F. Collar ☐
   G. Other (specify) _____

55c. PSYCHOLOGICAL
   A. Stress Management ☐
   B. Pain Management ☐
   C. Psychotherapy ☐
   D. Hypnotherapy ☐
   E. Biofeedback ☐
   F. Other (specify) _____

56. Has your physician ever **recommended** surgery for work-related problems in any of these areas?

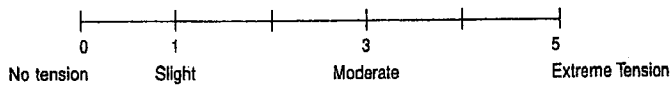|		
neck	☐ yes	☐ no
shoulder	☐ yes	☐ no
elbow	☐ yes	☐ no
forearm	☐ yes	☐ no
hand/wrist	☐ yes	☐ no

57. Have you ever **had** surgery for work-related problems in any of these areas?

neck   ☐ yes   ☐ no
shoulder   ☐ yes   ☐ no
elbow   ☐ yes   ☐ no
forearm   ☐ yes   ☐ no
hand/wrist   ☐ yes   ☐ no

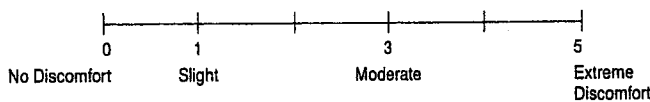58. Have you ever been told by a doctor that you had any of the following?

A. Diabetes   ☐ yes   ☐ no
B. Gout   ☐ yes   ☐ no
C. Thyroid problems   ☐ yes   ☐ no
D. Lupus   ☐ yes   ☐ no
E. Ruptured disc in the neck   ☐ yes   ☐ no
F. Ruptured disc in the back   ☐ yes   ☐ no
G. Rheumatoid arthritis   ☐ yes   ☐ no
H. Alcoholism   ☐ yes   ☐ no
I. Kidney failure   ☐ yes   ☐ no

59. Using the scale below, indicate the degree to which you experience **muscle tension** *during* your interpreting work in each part of the body listed:
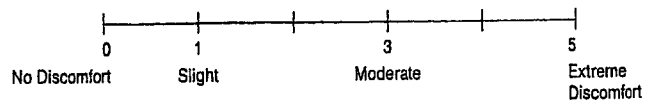
```
0      1           3           5
No tension  Slight  Moderate  Extreme Tension
```

	0	1	3	5
Fingers				
Hands				
Wrists				
Forearms				
Shoulders				
Neck				
Upper Back				
Lower Back				
Legs				
Entire Body				

60. Using the scale below, indicate the degree to which you experience **discomfort** *during* your interpreting work in each part of the body listed:

```
0      1           3           5
No Discomfort  Slight  Moderate  Extreme Discomfort
```

	0	1	3	5
Fingers				
Hands				
Wrists				
Forearms				
Shoulders				
Neck				
Upper Back				
Lower Back				
Legs				
Entire Body				

61. Using the scale below, indicate the degree to which you experience **discomfort** *after* your interpreting work in each part of the body listed:
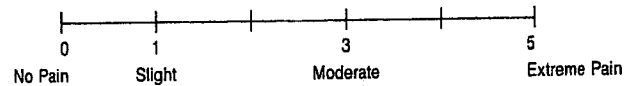
```
0      1           3           5
No Discomfort  Slight  Moderate  Extreme Discomfort
```

	0	1	3	5
Fingers				
Hands				
Wrists				
Forearms				
Shoulders				
Neck				
Upper Back				
Lower Back				
Legs				
Entire Body				

62. Using the scale below, indicate the degree to which you experience **pain** *during* your interpreting work in each part of the body listed:

```
0      1           3           5
No Pain  Slight  Moderate  Extreme Pain
```

	0	1	3	5
Fingers				
Hands				
Wrists				
Forearms				
Shoulders				
Neck				
Upper Back				
Lower Back				
Legs				
Entire Body				

63. Indicate the **average intensity of pain** you experience during an interpreting week.

```
0      1           3           5
No Pain  Slight  Moderate  Extreme Pain
```
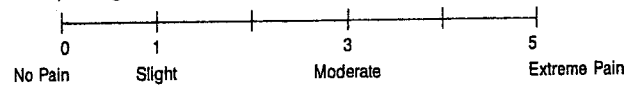
64. How frightened are you of **reinjuring** yourself?

```
0      1           3           5
Not at All  Slightly  Moderately  Extremely
```
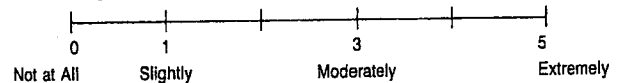
65. To what extent can you change the amount of pain and discomfort you experience by modifying your interpreting techniques?

```
0      1           3           5
Not at All  Slightly  Moderately  Greatly
```
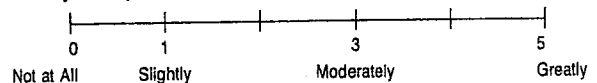
66. How often do you continue interpreting in a way that contributes to pain and discomfort in an effort to ensure accuracy and comprehension?

```
|-------|-------|---.---|-------|-------|
0       1               3               5
Not at All  Rarely      Sometimes       Extremely
```
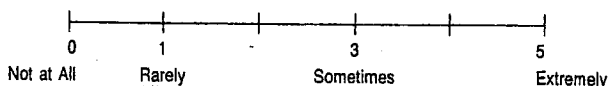
67. How many days of work have you missed in the past year due to pain or other problems in your hands, wrists, arms, elbows, shoulders, or neck?

_____ Number of partial days missed in the past year
_____ Number of full days missed in the past year

68. Indicate the extent to which you have changed your hobbies/leisure activities due to pain/discomfort in hands, wrists, arms, elbows, shoulders or neck.

```
|-------|-------|-------|-------|-------|
0       1               3               5
No Change  Slight       Moderate        Extreme Change
```

69. Indicate the extent to which you have changed your daily self-care activities due to pain/discomfort in hands, wrists, arms, elbows, shoulders, or neck.

```
|-------|-------|-------|-------|-------|
0       1               3               5
No Change  Slight       Moderate        Extreme Change
```

70. Have any symptoms of numbness, tingling, or pain caused you to be awakened while sleeping?

☐ Yes   ☐ No

71. Please indicate the time(s) of day when discomfort regularly occurs.

Mornings	☐ Yes	☐ No
Afternoons	☐ Yes	☐ No
Evenings	☐ Yes	☐ No
Night	☐ Yes	☐ No

72. Have your problem(s) ever been triggered by: (check)

☐ Typing
☐ Lifting or carrying
☐ Use of toothbrush
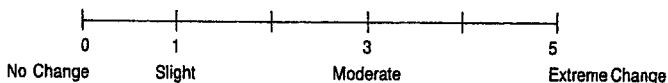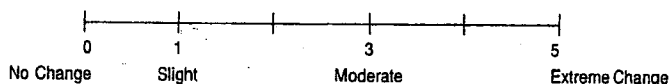☐ Writing
☐ Use of eating utensils
☐ Shaking hands
☐ Other (please specify) _____

73. If seated during an interpreting assignment, to what degree does your chair contribute to your discomfort?

```
|-------|-------|-------|-------|-------|
0       1               3               5
Not at All  Slightly     Moderately      Greatly
```
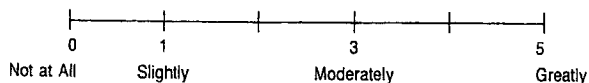
74. Rate the degree to which your upper extremity symptoms **over the past year** have negatively affected your ability to perform the following functions. Rate *each* function.

```
|-------|-------|-------|-------|-------|
0       1               3               5
Not at All  Slightly     Moderately      Greatly
```
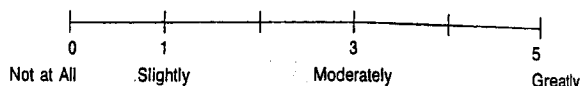
	0	1	3	5
Sleeping				
Getting milk jug				
Lifting a heavy box				
Reaching overhead				
Using a hammer				
Picking up small objects				
Opening jars				
Writing				
Driving over 30 minutes				
Hobbies				
Performing your job				
Keyboarding				
Carrying bags				
Grooming				
Cooking				
Housecleaning				
Dressing				

75. On an average week, do you participate in any combination of hobbies, sporting activities, art work, or play a musical instrument for a total of 3 hours or more?

☐ Yes   ☐ No

If yes, please list these activities and the number of hours per week.

Activities	Hours per week
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

The remaining section of this survey (Section V) asks questions regarding symptoms you might experience. Please answer **all** questions for each body location if you are currently experiencing symptoms or have had symptoms in that area in the past year. If you have not had symptoms in that body location in the past year, please indicate this and move to the next section. This will allow you to quickly complete the remaining pages.

HAND AREA

76. In the past year, have you had pain, aching, stiffness, burning, numbness, or tingling in the areas on this diagram?

☐ Yes (continue)   ☐ No (PLEASE GO TO NEXT PAGE)

Using the diagram below, shade in the most affected area on the diagram and circle the ONE WORD which best describes your worst symptom.
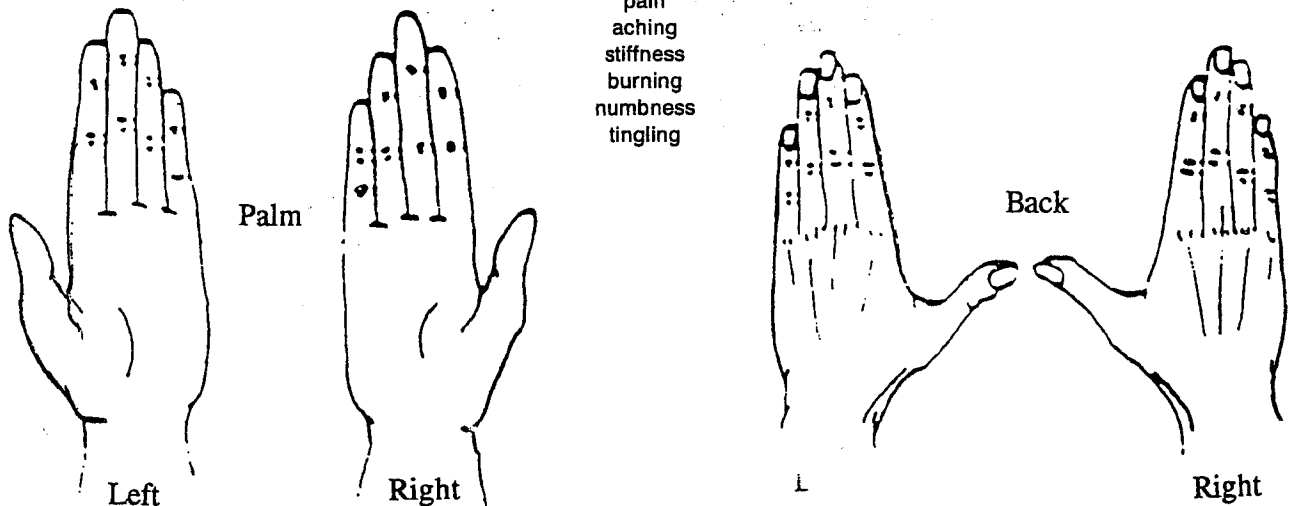
pain
aching
stiffness
burning
numbness
tingling

Palm

Back

Left   Right   L   Right

76a. Which is your dominant (writing) hand?   ☐ Left   ☐ Right

76b. How long does this HAND/WRIST problem usually last?

☐ Less than 1 hour   ☐ More than 1 day to 1 week   ☐ More than 2 weeks to 4 weeks   ☐ More than 3 months
☐ One hour to 1 day   ☐ More than 1 week to 2 weeks   ☐ More than 1 month to 3 months

76c. How often have you had this HAND/WRIST problem in the past year?

☐ Almost always (daily)   ☐ Rarely (every 2-3 months)
☐ Frequently (once a week)   ☐ Almost never (every 6 months)
☐ Sometimes (once a month)

76d. On average, describe the **intensity** of the HAND/WRIST problem using the scale below (circle the best answer).

0	1	2	3	4	5
No pain	Mild		Moderate		Worst pain ever in life

76e. When did you first experience this HAND/WRIST problem?   _____ Year

76f. What job were you doing when you first noticed this HAND/WRIST problem?

☐ Current job   ☐ Other job (please describe) _____

76g. Do activities at work make this HAND/WRIST problem   ☐ Better   ☐ Worse   ☐ No Change

76h. Have you had this HAND/WRIST problem in the past 7 days?   ☐ Yes   ☐ No

76i. Which hand bothers you most?   ☐ Right   ☐ Left   ☐ Both

76j. In the **past year**, has this HAND/WRIST problem resulted in your:

1. Seeing a health care provider?   ☐ No   ☐ 1 to 5 times   ☐ More than 5 times
2. Missing work?   ☐ No   ☐ 1 to 5 times   ☐ More than 5 times
3. Reducing your interpreting hours, or being assigned to a different or lighter schedule?   ☐ No   ☐ 1 to 5 times   ☐ More than 5 times

76k. Have you ever had an accident or sudden injury to your HAND/WRIST, such as a deep cut, a sports injury, fracture, or tendon tear not related to your work at this worksite?   ☐ Yes   ☐ No

9

NECK AREA
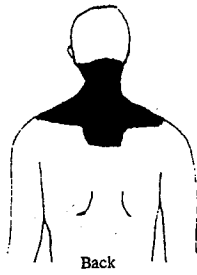
77. In the **past year**, have you had pain, aching, stiffness, burning, numbness or tingling in the area shown on this diagram?

☐ Yes (continue)   ☐ No (Please go to shoulder questions [#78] below)

77a. How long does this NECK problem usually last?

☐ Less than 1 hour   ☐ More than 1 day to 1 week   ☐ More than 2 weeks to 4 weeks   ☐ More than 3 months
☐ One hour to 1 day   ☐ More than 1 week to 2 weeks   ☐ More than 1 month to 3 months

77b. How often have you had this NECK problem in the past year?

☐ Almost always (daily)   ☐ Sometimes (once a month)   ☐ Almost never (every 6 months)
☐ Frequently (once a week)   ☐ Rarely (every 2-3 months)

77c. On average, describe the **intensity** of the NECK problem using the scale below (circle the best answer)

0	1	2	3	4	5
No pain	Mild		Moderate		Worst pain ever in life

77d. When did you first experience this NECK problem?   _____ Year

77e. What job were you doing when you first noticed this NECK problem?

☐ Current job   ☐ Other job (please describe) _____

77f. Do activities at work make this NECK problem   ☐ Better   ☐ Worse   ☐ No Change

77g. Have you had this NECK problem in the past 7 days?   ☐ Yes   ☐ No

77h. Which side bothers you most?   ☐ Right   ☐ Left   ☐ Both

77i. In the past year, has this NECK problem resulted in your:

1. Seeing a health care provider?   ☐ No ☐ 1 to 5 times ☐ More than 5 times
2. Missing work?   ☐ No ☐ 1 to 5 times ☐ More than 5 times
3. Reducing your interpreting hours, or being assigned to a different or lighter schedule?   ☐ No ☐ 1 to 5 times ☐ More than 5 times

77j. Have you ever had an accident or sudden injury to your NECK, such as whiplash, a sports injury, fracture, or a sudden slipped disc not related to your work at this worksite?   ☐ Yes   ☐ No

SHOULDER AREA
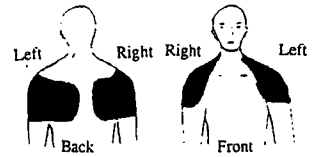
78. In the **past year**, have you had pain, aching, stiffness, burning, numbness, or tingling in the area shown on this diagram?

☐ Yes (continue)   ☐ No (Please go to elbow area [#79] on next page)

78a. How long does this SHOULDER problem usually last?

☐ Less than 1 hour   ☐ More than 1 day to 1 week   ☐ More than 2 weeks to 4 weeks   ☐ More than 3 months
☐ One hour to 1 day   ☐ More than 1 week to 2 weeks   ☐ More than 1 month to 3 months

78b. How often have you had this SHOULDER problem in the past year?

☐ Almost always daily)   ☐ Sometimes (once a month)   ☐ Almost never (every 6 months)
☐ Frequently (once a week)   ☐ Rarely (every 2-3 months)

78c. On average, describe the **intensity** of the SHOULDER problem using the scale below (circle the best answer)

	0	1	2	3	4	5
	No pain	Mild		Moderate		Worst pain ever in life

78d. When did you first experience this SHOULDER problem? _____ Year

78e. What job were you doing when you first noticed this SHOULDER problem?

☐ Current job ☐ Other job (please describe) _____

78f. Do activities at work make this SHOULDER problem ☐ Better ☐ Worse ☐ No Change

78g. Have you had this SHOULDER problem in the past 7 days? ☐ Yes ☐ No

78h. Which shoulder bothers you most? ☐ Right ☐ Left ☐ Both

78i. In the **past year**, has this SHOULDER problem resulted in your:
1. Seeing a health care provider? ☐ No ☐ 1 to 5 times ☐ More than 5 times
2. Missing work? ☐ No ☐ 1 to 5 times ☐ More than 5 times
3. Reducing your interpreting hours, or being assigned to a different or lighter schedule? ☐ No ☐ 1 to 5 times ☐ More than 5 times

78j. Have you ever had an accident or sudden injury to your SHOULDER, such as a sports injury, fracture, or tendon tear not related to your work at this worksite? ☐ Yes ☐ No

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ELBOW AREA

79. In the **past year**, have you had pain, aching, stiffness, burning, numbness or tingling in the area shown on this diagram?

☐ Yes (continue) ☐ No (Please go to upper back question [#80] on next page)
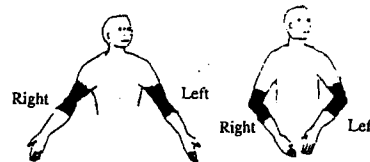
79a. How long does this ELBOW problem usually last?

☐ Less than 1 hour ☐ More than 1 day to 1 week ☐ More than 2 weeks to 4 weeks ☐ More than 3 months
☐ One hour to 1 day ☐ More than 1 week to 2 weeks ☐ More than 1 month to 3 months

79b. How often have you had this ELBOW problem in the past year?

☐ Almost always (daily) ☐ Sometimes (once a month) ☐ Almost never (every 6 months)
☐ Frequently (once a week) ☐ Rarely (every 2-3 months)

79c. On average, describe the **intensity** of the ELBOW problem using the scale below (circle the best answer)

	0	1	2	3	4	5
	No pain	Mild		Moderate		Worst pain ever in life

79d. When did you first experience this ELBOW problem? _____ Year

79e. What job were you doing when you first noticed this ELBOW problem?

☐ Current job ☐ Other job (please describe) _____

79f. Do activities at work make this ELBOW problem ☐ Better ☐ Worse ☐ No Change

79g. Have you had this ELBOW problem in the past 7 days? ☐ Yes ☐ No

79h. Which side bothers you most? ☐ Right ☐ Left ☐ Both

79i. In the past year, has this ELBOW problem resulted in your:

    1. Seeing a health care provider?   ☐ No ☐ 1 to 5 times ☐ More than 5 times

   2. Missing work?   ☐ No ☐ 1 to 5 times ☐ More than 5 times

    3. Reducing your interpreting hours, or being assigned to a different or lighter schedule?   ☐ No ☐ 1 to 5 times ☐ More than 5 times

79j. Have you ever had an accident or sudden injury to your ELBOW, such as a sports injury, fracture, or tendon tear not related to your work at this worksite?   ☐ Yes   ☐ No

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FOREARM AREA

80. In the **past year,** have you had pain, aching, stiffness, burning, numbness, or tingling in the area shown on this diagram?

    ☐ Yes (continue)   ☐ No (Please go to upper back question [#81] below)

80a. How long does this FOREARM problem usually last?

    ☐ Less than 1 hour   ☐ More than 1 day to 1 week   ☐ More than 2 weeks to 4 weeks   ☐ More than 3 months
    ☐ One hour to 1 day   ☐ More than 1 week to 2 weeks   ☐ More than 1 month to 3 months

80b. How often have you had this FOREARM problem in the past year?

    ☐ Almost always (daily)   ☐ Sometimes (once a month)   ☐ Almost never (every 6 months)
    ☐ Frequently (once a week)   ☐ Rarely (every 2-3 months)

80c. On average, describe the **intensity** of the FOREARM problem using the scale below (circle the best answer)

    0   1   2   3   4   5
    No pain   Mild   Moderate   Worst pain ever in life

80d. When did you first experience this FOREARM problem?   _____ Year

80e. What job were you doing when you first noticed this FOREARM problem?

    ☐ Current job   ☐ Other job (please describe) _____

80f. Do activities at work make this FOREARM problem   ☐ Better   ☐ Worse   ☐ No Change

80g. Have you had this FOREARM problem in the past 7 days?   ☐ Yes   ☐ No

80h. Which FOREARM bothers you most?   ☐ Right ☐ Left ☐ Both

80i. In the **past year,** has this FOREARM problem resulted in your:

    1. Seeing a health care provider?   ☐ No ☐ 1 to 5 times ☐ More than 5 times

    2. Missing work?   ☐ No ☐ 1 to 5 times ☐ More than 5 times

    3. Reducing your interpreting hours, or being assigned to a different or lighter schedule?   ☐ No ☐ 1 to 5 times ☐ More than 5 times

80j. Have you ever had an accident or sudden injury to your FOREARM, such as a sports injury, fracture, or tendon tear not related to your work at this worksite?   ☐ Yes   ☐ No

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UPPER BACK AREA

81. In the **past year,** have you had pain, aching, stiffness, burning, numbness, or tingling in the area shown on this diagram?

    ☐ Yes (continue)   ☐ No (Please go to low back question [#82] below)
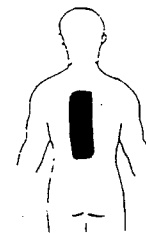
80a. How long does this UPPER BACK problem usually last?

    ☐ Less than 1 hour   ☐ More than 1 day to 1 week   ☐ More than 2 weeks to 4 weeks   ☐ More than 3 months
    ☐ One hour to 1 day   ☐ More than 1 week to 2 weeks   ☐ More than 1 month to 3 months

Back

81b. How often have you had this UPPER BACK problem in the past year?

☐ Almost always (daily)　　　　☐ Sometimes (once a month)　　　☐ Almost never (every 6 months)
☐ Frequently (once a week)　　 ☐ Rarely (every 2-3 months)

81c. On average, describe the **intensity** of the UPPER BACK problem using the scale below (circle the best answer)

	0	1	2	3	4	5
	No pain	Mild		Moderate		Worst pain ever in life

81d. When did you first experience this UPPER BACK problem?　　＿＿＿＿＿＿ Year

81e. What job were you doing when you first noticed this UPPER BACK problem?

☐ Current job　　　　☐ Other job (please describe) ＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

81f. Do activities at work make this UPPER BACK problem　　☐ Better　　☐ Worse　　☐ No Change

81g. Have you had this UPPER BACK problem in the past 7 days?　　☐ Yes　　☐ No

81h. In the **past year**, has this UPPER BACK problem resulted in your:

1. Seeing a health care provider?　　☐ No　☐ 1 to 5 times　☐ More than 5 times
2. Missing work?　　☐ No　☐ 1 to 5 times　☐ More than 5 times
3. Reducing your interpreting hours, or being assigned to a different or lighter schedule?　　☐ No　☐ 1 to 5 times　☐ More than 5 times

81i. Have you ever had an accident or sudden injury to your UPPER BACK, such as whiplash, a sports injury, fracture, or sudden slipped disc not related to your work at this worksite?　　☐ Yes　　☐ No

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LOW BACK AREA
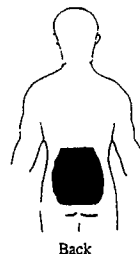
82. In the **past year**, have you had pain, aching, stiffness, burning, numbness or tingling in the area shown on this diagram?

☐ Yes (continue)　　☐ No (Please go to open-ended question on the next page)

Back

82a. How long does this LOW BACK problem usually last?

☐ Less than 1 hour　　☐ More than 1 day to 1 week　　☐ More than 2 weeks to 4 weeks　　☐ More than 3 months
☐ One hour to 1 day　 ☐ More than 1 week to 2 weeks　 ☐ More than 1 month to 3 months

82b. How often have you had this LOW BACK problem in the past year?

☐ Almost always (daily)　　　　☐ Sometimes (once a month)　　　☐ Almost never (every 6 months)
☐ Frequently (once a week)　　 ☐ Rarely (every 2-3 months)

82c. On average, describe the **intensity** of the LOW BACK problem using the scale below (circle the best answer)

	0	1	2	3	4	5
	No pain	Mild		Moderate		Worst pain ever in life

82d. When did you first experience this LOW BACK problem?　　＿＿＿＿＿＿ Year

82e. What job were you doing when you first noticed this LOW BACK problem?

☐ Current job　　　　☐ Other job (please describe) ＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

82f. Do activities at work make this LOW BACK problem　　☐ Better　　☐ Worse　　☐ No Change

82g. Have you had this LOW BACK problem in the past 7 days?　　☐ Yes　　☐ No

82h. Which side bothers you most?　　☐ Right　　☐ Left　　☐ Both

13

82i. In the past year, has this LOW BACK problem resulted in your:

1. Seeing a health care provider? ☐ No ☐ 1 to 5 times ☐ More than 5 times

2. Missing work? ☐ No ☐ 1 to 5 times ☐ More than 5 times

3. Reducing your interpreting hours, or being assigned to a different or lighter schedule? ☐ No ☐ 1 to 5 times ☐ More than 5 times

82j. Have you ever had an accident or sudden injury to your LOW BACK, such as a sprain, a sports injury, fracture, or sudden slipped disc not related to your work at this worksite? ☐ Yes ☐ No

83. Please estimate the amount of time you spend on an average day signing outside of work (to colleagues, family members, friends).

_____ Hours _____ Minutes

In the space below, please tell us what you are doing, if anything, that you think is contributing to your symptoms or preventing you from experiencing symptoms. Please use additional paper if you need more room.

THANK YOU FOR YOUR COOPERATION. DO NOT FORGET TO RETURN YOUR COMPLETED SURVEY AND LOTTERY SLIP TODAY.

Please cut off and return in envelope
with completed survey

REPETITIVE MOTION DISORDER SURVEY
LOTTERY ENTRY FORM

Name _____

Address _____

_____

Phone_____

**TO ENTER YOUR NAME IN A $300 CASH DRAWING,
RETURN YOUR COMPLETED SURVEY AND THIS FORM AS SOON AS POSSIBLE,
BUT NOT LATER THAN NOVEMBER 30, 1992.**

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