

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

**THE RELATIONSHIP BETWEEN  
PERCEPTIONS OF  
RECOVERY AND PAIN  
BELIEFS IN OCCUPATIONAL  
OVERUSE SYNDROME**

A thesis presented in partial  
fulfilment of the requirements  
for the degree of Master of  
Arts in Psychology at Massey  
University.

Lucinda Allison  
2001

## **Abstract**

Occupational Overuse Syndrome (OOS or RSI) is an umbrella term for a range of conditions characterised by pain and discomfort in the soft tissues and muscle weakness. Cognitive-behavioural theory suggests that the beliefs of people in pain can influence their functioning and research findings support a relationship between pain beliefs and levels of pain and functioning. However there has been little research into how beliefs influence recovery from the range of OOS conditions. The main goals of this study were to examine the relationship between pain beliefs and recovery and between pain and functioning. Sixty-four people with OOS completed questionnaires to determine their pain beliefs and levels of pain and functioning. Correlations provided little support for a relationship between beliefs and recovery but supported a relationship between pain and functioning. This study highlighted the limitations of the beliefs research and recommended that future research investigate the influence of the interaction of beliefs and treatment on recovery. It also highlighted the importance of distinguishing between the different types of OOS rather than treating them all as the same condition.

## **Acknowledgements**

I would like to thank Christine Stephens who has been an excellent supervisor and helped to make this project an enjoyable exercise.

I would also like to thank all those people with OOS who participated in this study.

Finally I would like to thank Rosemary Harris (Disabilities Support Coordinator) and Ross Flett and Nancy Pachana (Graduate Studies Coordinators) who made it possible for me to undertake this research.

## Table of Contents

<b>OCCUPATIONAL OVERUSE SYNDROME (OOS)</b> .....	<b>1</b>
Introduction .....	1
The Impact of OOS .....	2
Causes of OOS.....	4
The Development of OOS .....	7
Diagnosis .....	11
Treatment .....	16
The Relationship between Pain and Functioning .....	18
<b>PAIN BELIEFS</b> .....	<b>22</b>
Introduction .....	22
Types of Beliefs .....	22
Cognitive-Behavioural Interventions.....	31
Limitations of Beliefs Research.....	33
<b>AIMS AND HYPOTHESES</b> .....	<b>37</b>
<b>METHOD</b> .....	<b>40</b>
Participants .....	40
Procedure.....	41
The Measures.....	42
Analysis of the Responses.....	55
<b>RESULTS</b> .....	<b>58</b>
Descriptive Characteristics of the Sample .....	58

Hypothesis Testing .....	63
<b>DISCUSSION.....</b>	<b>69</b>
Findings and Implications .....	69
Methodological Limitations .....	77
Implications for Future Research .....	80
Conclusions.....	83
<b>REFERENCES .....</b>	<b>85</b>
<b>APPENDICES.....</b>	<b>95</b>
Appendix A: Information sheet.....	96
Appendix B: Questionnaire used in this study .....	97

## List of Tables and Figures

### Figure:

1. Graph showing reported levels of disruption to typing .....61
2. Graph showing reported levels of disruption to walking.....61

### Table:

1. Sources of participants .....40
2. Definitions of values of Diagnostic Variable 1.....43
3. Definitions of values of Diagnostic Variable 2.....44
4. Pain and function variables, value ranges, and questionnaire item nos.....46
5. Internal reliability scores for pain beliefs variables .....52
6. Length of time since first diagnosis .....58
7. Number of participants fitting ACC classification using Diagnostic Variable 2.....59
8. Frequency of prior pain .....60
9. Beliefs scores .....62
10. Correlations between pain beliefs and recovery .....65
11. Correlations between pain and function variables .....66
12. Correlations between pain beliefs variables .....68

# Occupational Overuse Syndrome (OOS)

## Introduction

Occupational Overuse Syndrome (OOS) has been a major problem throughout the Western World. Although some interventions have been useful, it has continued to be a difficulty for people with OOS, their families, employers, and insurance companies. Some of these difficulties arise from the controversies surrounding diagnosis and treatment of the condition, the relationship between pain and disability, and the part that beliefs play in recovery.

The first section of this study investigates the nature of OOS and the extent of the problem. The various theories about causes and physiological mechanisms underlying OOS are then presented to facilitate understanding of the issues surrounding diagnosis and treatment.

Following this, discussions on diagnosis and treatment are presented. The term OOS covers a wide range of conditions which require different management and have different prognoses. In many instances, researchers and treatment providers have treated all types of OOS as the same condition. However, to investigate recovery from OOS, it is important to distinguish between the different types of OOS and understand the difficulties surrounding making a differential diagnosis.

Next the relationship between pain and disability is explored as recovery needs to be viewed in terms of a decrease in both pain and disability.

## The Impact of OOS

### Definition

OOS is a collective term for a range of conditions characterised by discomfort or pain in muscles, tendons, and other soft tissues with or without physical signs (Wigley et al., 1992). Symptoms may also include fatigue, weakness, swelling, hardening, crepitus (crackling) (Bammer & Blignault, 1988), or muscle stiffness (Wigley et al., 1992).

In 1995 the Accident Compensation Commission (ACC) set up an OOS prevention taskforce which recommended the following definition:

Occupational Overuse Syndrome (OOS) is an umbrella term covering a range of disorders characterised by pain and/or other sensations in muscles, tendons, nerves, soft tissues and joints with evidence of clinical signs. Symptoms such as pain, discomfort, and muscle weakness may continue even after initial clinical signs have diminished.

The disorders are caused, or significantly contributed to, by occupational factors including prolonged muscle tension, repetitive actions, forceful movements, and sustained or constrained postures, which exceed the usual ability of the body to rapidly recover.

Other medical conditions causing the same or similar symptoms have been excluded (e.g. some rheumatological conditions, prolonged inactivity, or disuse of muscles) (Slappendel, 1996, p. 21).

Other names for OOS include repetitive strain injury (RSI), cumulative trauma disorder (CTD), occupational cervicobrachial disorder (OCD), repetitive motion injury (RMI), regional pain syndrome (Stephens, 1993), and work-related upper limb disorder (Helliwell, Mumford, Smeathers & Wright, 1992). For the purposes of this study, the term “OOS” will be used.

#### The experience of OOS

OOS is experienced throughout home and work lives. People have difficulty performing activities outside work including using the telephone, writing, dressing, personal hygiene, using cutlery, vacuuming, carrying, using public transport, and driving (Bammer & Blignault, 1988). Other aspects affected include self-esteem, interpersonal relationships, sporting activities, social activities, financial difficulties, alcohol and medication intake, fears about the future, and coping with people who don't believe OOS exists (Dorland & Hattie, 1992).

The greater the disability, the more these areas are affected. For instance, Shadbolt (1988), in a study of OOS sufferers, found the greater the disability the more they experienced stress from work, family, and their social environment. However their desire to work and

perceptions of the importance and challenge of their work was no different from controls. OOS sufferers who had experienced redeployment were happy to be working but lacked self confidence and were worried about their future.

### The incidence of OOS

OOS is a problem in most industrialised centres (Spence, 1991). In Australia, reported incidence of OOS increased rapidly from the late 1970s to the mid 1980s particularly amongst clerical and keyboard workers. For example, there was a three-fold increase in compensation claims amongst New South Wales female workers from 1978 to 1982 (Swerissen, Matyas & Thomas, 1991).

In 1989 there were 20,637 work related injuries of the elbow, wrist, and fingers reported in Canada with work related chronic injuries of the upper limb estimated to be the most expensive work injury after low back pain (Ranney, 1993).

The number of new ACC claims for OOS in New Zealand increased by 42% between the 1995 and 1996 financial years (ACC Statistics Section, 1995).

### Causes of OOS

There has been much discussion and controversy on the causes of OOS with the main causes being identified as work habits, work environment, and psychological factors. In order to develop effective prevention and treatment strategies, it is important to understand how all these factors contribute to the development of OOS.

### Work environment

OOS has tended to be more prevalent in work environments where stress levels and work loads are high. For instance, Spillane and Deves (1988) and Stephens (1993) have found support for a relationship between OOS and psychosocial factors including low autonomy, low peer cohesion, high work pressure, and low levels of staff support. Browne, Nolan, and Faithfull (1984) have identified long work periods without rest, bonus and overtime incentives, lack of training and inadequate supervision, delayed reporting, and equipment design faults as contributors to OOS. Reasons for delayed reporting include ignorance of the significance of symptoms; fear of job loss; economic pressure; language barriers; the absence of alternative duties; and the attitudes of the supervisor, health personnel, and fellow workers.

### Work habits

The way in which employees perform their work has also been found to contribute to the development of OOS. The onset of OOS is generally related to a repetitive occupational task such as keyboard work (Spence, 1991) and is associated with sustained or constrained postures and/or forceful movements (Dorland & Hattie, 1992). Other factors contributing to the development of OOS include inefficient posture, repetitive movement, excessive force, positioning the joint outside the comfortable range, and muscle tension associated with stress (Browne, Nolan & Faithfull, 1984).

### Psychological factors

Personality has also been viewed as a major contributor to OOS. People who develop OOS are seen as highly motivated with strong work ethics (Bammer & Martin, 1988). A person with OOS is usually well dressed and tends to be a perfectionist. They tend to be competitive and increase effort by missing tea breaks and eating lunch at the keyboard. They are usually one of the fastest workers in the group (Wigley, 1990) and may deny symptoms and press on regardless, hoping to ride over the problem (Bammer & Martin, 1988). They may delay reporting through fear of dismissal or retaliatory action or through loyalty (Bammer & Martin, 1988) and there is almost always a strong desire to return to work after their injury (Wigley, 1990). In addition to being perfectionists and highly motivated, people with OOS have also displayed psychological changes that are typical of people in chronic pain. These include self-absorption, withdrawal from interpersonal contact, anxiety, resentment, depression, and feelings of helplessness due to loss of control over their environment (Cousins, 1989). They have often developed negative feelings about themselves and have low self esteem, self worth, and self confidence. They express fears that others see them as malingerers and they will go to great lengths to seek legitimisation of their illness. Decreased ability to work is common (Gaston-Johansson, Gustafsson, Felldin & Sanne, 1990). This has led to much stigmatising of people in pain, including people with OOS, with some attributing the high incidence of OOS to mass hysteria (Bammer & Martin, 1988).

As people in chronic pain display a wide range of psychological problems and treatment has failed to alleviate the pain, many authors have concluded that the pain is caused by psychological disturbance. However these studies have not shown a causal link (Gamsa, 1990). Gamsa investigated the nature of the relationship between psychological factors and pain and concluded that the emotional disturbance is more likely to be caused by pain than to be the cause of the pain. In her study she compared chronic pain patients with non pain controls on current emotional disturbances and on antecedent events that have been identified as significant in the etiology of pain (e.g. parental beatings). She concluded that although the cause of chronic pain may be psychological in some cases, this is probably true for a minority only.

It is likely that there is a interaction between pain and psychological factors. Craig (1989) suggests that a pain-anxiety-tension cycle is prevalent in musculoskeletal disorders where pain provokes anxiety which provokes physiological responses such as muscle spasms at the location of pain which in turn releases pain producing substances.

## The Development of OOS

### Stages of development

Some authors (e.g. Bammer & Martin, 1988; Ranney, 1993) believe that OOS progresses through three stages. At stage one sufferers experience pain and fatigue when working. At stage two pain may persist into the evening after the person has stopped working and may be accompanied by physical signs. At stage three the symptoms may still be present in the morning and occur during other activities and at rest.

If OOS is treated in the early stages the condition is reversible. However, if the condition progresses beyond a certain point, treatment is not so easy (Wigley et al, 1992). Despite this finding, people still allow OOS to progress to later stages. This may be partially because some individuals experience a “phasic stage”. The phasic stage occurs immediately after the person has been injured at which time many report feeling no pain. This usually occurs in stressful situations as stress can activate an analgesic response. Anecdotal evidence has shown that, under pressure, people often ignore injuries that would disrupt activities, for instance soldiers on the battlefield or athletes on the playing field. People do not focus on healing activities such as rest until the emergency has passed (Craig, 1989). It is likely that workers under pressure could also ignore pain until they take a holiday or a deadline is met. However, the length of time during which the worker is under stress far exceeds the duration of a rugby game. Thus workers could be aggravating injuries over long periods of time without being aware of pain.

#### Physiological mechanisms

Because chronic pain is so difficult to treat and there is often no observable injury, some authors view it as psychosomatic (Craig, 1989). However others argue that the pain has a physiological basis and have described the underlying mechanisms. Some authors describe conditions such as OOS mainly in terms of soft tissue disorder, however in recent times there has been evidence to suggest that chronic pain is caused by sensorimotor disorders or disorders of cortical control. In order to investigate recovery in OOS it is important to have an understanding of the underlying physiological mechanisms.

### Soft tissue theories

Wigley et al. (1992) believe OOS is caused by tense muscles putting pressure on the blood vessels passing between the muscle fibres. This restricts the flow of blood to the muscles and tendons. When the muscles no longer receive the energy they require from the blood, anaerobic metabolism takes place. The energy store in the muscle is quickly exhausted and there is a build up of lactic acid in the muscle which stimulates pain receptors. The muscle pain causes neighbouring muscles to tense up in sympathy. This is called a splinting reaction and is useful where bracing is needed for acute injuries such as broken bones. However in overuse syndrome, this can cause a self-sustaining pain cycle where pain fluctuates in intensity from mild to intolerable. An inadequate supply of blood to the nerves may also lead to numbness and tingling. More definite numbness and tingling may result where larger nerves passing between muscles are squeezed.

Evidence for entrapment of the nerve has been provided by Greening et al. (1999). They used magnetic resonance scans on people with non-specific pain and found reduced movement of the median nerve in the carpal tunnel. They suggest that compression on the nerve has been shown to cause pain and that nerve entrapment in other sites of the body explains why pain in some people is more diffuse.

### Sensorimotor theories

Although theories of muscle bracing and nerve entrapment explain why people with OOS have pain during activity and immediately after, they do not explain why, after long

periods of rest, people are unable to return to activities that have caused them pain in the past. However this phenomenon can be understood by thinking in terms of disorders of cortical control or sensorimotor disorders. After prolonged periods of pain and muscle bracing, there is a change in the regulation of agonist and antagonist muscle control. This is described by Ruth and Kegerreis (1992) who suggest that the use of some muscles may be inhibited by trauma or abnormal movement patterns, which leads to less activity or weakness in some muscles and increased activity and tightness in other muscles.

Byl and Melnick (1997) suggest there is a risk of developing OOS with activities which require co-contraction of agonist and antagonist muscles (e.g. writing) or near-simultaneous contraction of adjacent digits (e.g. piano playing). These movements may be interpreted as simultaneous and eventually the precise representation of the digits is degraded, i.e. the hand representation on the somatosensory cortex is degraded. Evidence to support this phenomenon is provided by Byl, Merzenich, Cheung, Bedenbaugh, and Jenkins (1997). In their study, monkeys repetitively performed a hand squeezing activity. This resulted in motor deterioration, tremors, signs of pain, and dedifferentiation of the normally clearly segregated areas of hand representation in the primary sensory cortex.

The pain or physical deficit associated with these sorts of disorders inhibit body representation still further which leads to more pain and frequently effects one's ability to regain function (Byl & Melnick, 1997; Ruth & Kegerreis, 1992).

## Diagnosis

### The importance of a differential diagnosis

In much of the psychological research OOS is treated as a single condition yet it is really an umbrella term for a number of possible diagnoses, all of which may be treated differently and have different prognoses. In recent years, practitioners have highlighted the value of making an accurate diagnosis. As Ranney (1993) points out, terms like OOS and CTD are only statements of causation and, used as diagnosis, obscure the issue. It is important to identify the tissue injured, the nature of the pathology and the cause as this allows proper treatment and prevention. For example, localised inflammations such as muscle strains, tendinitis, tenosynovitis and neuritis all need different treatment (Ranney 1993).

Prior to 1995 many New Zealand treatment providers were not attempting to define the type of OOS experienced by their patients; others were only diagnosing OOS in the presence of pain conditions such as myofascial pain syndrome or chronic pain syndrome. However, in 1995, an ACC taskforce recommended that an accurate differential diagnosis was important so that the right treatment could be prescribed. For some conditions physiotherapy might be the appropriate treatment; for others surgery or counselling might be more appropriate. Specific diagnosis could also reduce confusion amongst people with OOS and their employers (Slappendel, 1996). Chronic pain patients often don't have a

diagnostic label and explanation for their pain. This uncertainty and lack of knowledge can cause increased anxiety which increases the pain (Rowat and Jeans, 1989).

#### The difficulties of making a diagnosis

However, making an accurate diagnosis has posed problems. As repetitive tasks often require the actions of several muscle groups, several structures are overloaded and multiple syndromes can result (Bammer & Martin, 1988) leading to several possible diagnoses.

Discriminating between pain that is physical in origin and pain that is psychological in origin has also caused problems when making a diagnosis. In the absence of obvious organic pathology, some practitioners conclude that psychological factors are causing the pain (Craig, 1989; Gamsa, 1990). However the presence of psychological states such as depression do not preclude organic pathology and, as Gamsa (1990) warns, an emotionally stable patient may begin to believe they are “going crazy” because it is implied that their mental status is in question.

Perhaps part of the reason that practitioners are unable to identify an organic pathology is that the limitations of the tests used make accurate diagnosis difficult. Throughout the literature authors write of pain without obvious tissue damage being an indicator of psychological disturbance (e.g. Elton, Hanna & Treasure, 1994; Lucire, 1988). The assumption is that the existing medical tests currently used have the ability to detect all physiological causes, yet it is clear new research is continually bringing to light tests that

provide further evidence of physiological mechanisms that may be causing the pain. For instance, Byl et al. (1997) used cortical mapping procedures to demonstrate degradation of hand representation in the primary sensory cortex. Sharma, Smith, Hazleman, and Jenner (1997) used hand temperature as a measure of pathology. They identified hand temperature differences between patients with chronic forearm pain and asymptomatic controls. Greening and Lynn (1998) used a vibrometer, a device used to detect neuropathic disorders by testing sensitivity to vibration, as they found that people with OOS had reduced sensitivity to vibration of the ulnar nerve.

The difficulties arising over diagnosis are complicated by the fact that compensation systems need a medical practitioner to certify the existence of an injury. This means that medical practitioners need to make a judgement about the validity of subjective reports and they may be forced to defend their judgement in court. They have to protect the interests of the patient and the state and maintain professional credibility (Swerissen, Matyas & Thomas, 1991). The consequences of this may be that diagnosis may partly depend on where the practitioner's allegiances ultimately lie.

### Diagnostic classification systems

#### Localised and diffuse types

Several authors have attempted to group OOS conditions into some type of classification system. For example, Swerissen, Matyas, and Thomas (1991) and Wigley et al. (1992) suggest that OOS injuries can be divided into two types: localised conditions and diffuse conditions.

Localised conditions are well known clinical conditions such as carpal tunnel syndrome and tendinitis which are caused by overuse or straining of muscle tendon units. These resolve with standard treatment such as analgesics, anti-inflammatories, and rest (Swerissen, Matyas & Thomas, 1991). These conditions are localised with easily recognisable symptoms. They include inflammation of tendon sheaths, inflammation at muscle insertions, inflammation of tendons, trigger finger, carpal tunnel syndrome, chronic pain syndrome, writer's cramp, and ganglion (Wigley et al., 1992).

Diffuse conditions are less well defined conditions with diffuse symptoms that do not improve with standard treatment (Swerissen, Matyas & Thomas, 1991). They are not so well understood and are less localised. They consist of diffuse muscle discomfort with pain, burning and/or tingling and there are identifiable areas of tenderness in the muscles. These symptoms are consistent with overuse and neurovascular involvement. Often it is difficult for medical practitioners to detect the cause of pain. Because of this the condition may be interpreted as "all in the mind" and psychological factors caused by the stress of having severe OOS may be wrongly interpreted as being the main cause of the problem (Wigley et al., 1992).

In both types there is consistent muscle pain and discomfort. However in the first group there are often objective signs while in the second group subjective reporting is relied on (Swerissen, Matyas & Thomas, 1991). Sometimes the two types of conditions can

overlap and it is likely that in many people the condition progresses from a diffuse condition to a localised condition or vice versa (Wigley et al., 1992).

#### Localised inflammations, compression syndromes and pain syndromes

In 1995, the ACC taskforce for treatment providers expanded the classification into three groups of conditions: localised inflammations; compression syndromes; and pain syndromes (Occupational Safety and Health Service, 1997).

It is thought localised inflammations and compression syndromes are caused by holding tense postures for too long and forceful and repeated movements which can lead to tendon lesions and nerve entrapment. Objective signs of injury may be present (Occupational Safety and Health Service, 1997).

It is thought that pain syndromes begin with muscle tension which leads to a progression of symptoms. These symptoms include fatigue, aches and pains, burning, numbness, tissue swelling, disturbed sleep, muscle discomfort (including weakness, soreness and heaviness), tingling, vascular reactivity, and tenderness. There is often no evidence of an injury and objective symptoms are not definite or are absent. Because of this some health professionals may not accept the condition as real (Occupational Safety and Health Service, 1997).

It is likely that pain syndromes are much more common than localised inflammations and compression syndromes and at times a pain syndrome can mimic a localised condition

(Occupational Safety and Health Service, 1997). When the physiological mechanisms of OOS described on page 8 are taken into account it is conceivable that the progression from a localised condition to a pain syndrome may be merely the progression from localised muscle splinting to a sensorimotor disorder.

Although a cross-sectional study may indicate that some people have localised conditions whilst others may have a pain syndrome, a temporal study may show that symptoms progress from one type to another (Occupational Safety and Health Service, 1997).

### Treatment

An important element of rehabilitation from OOS is minimising pain without limiting function more than is necessary (Occupational Safety and Health Service, 1997). It is believed that resting the injured part while maintaining activity in other areas allow healing to take place (Ranney, 1993). Sometimes a period off work may be necessary, but some believe this should not be for extended periods as a prompt return to work has at times been found to help rehabilitation, providing the client does not return to the situation that caused the problem (Occupational Safety and Health Service, 1997). Bammer and Blignault (1988) warn that the suggestion that returning to work may promote recovery should be treated with caution. There have been well documented cases where difficulties have been compounded because people returned to work while still in severe pain.

Treatment of localised inflammations and compression syndromes generally focuses on the contribution of muscle and neural tension. Even though the affected part may not be the muscle, tension in the muscle attached to the affected part is seen to be the main cause of the problem. Most treatments of these conditions address a physical problem and may include steroid injections, heat, ultrasound, acupuncture, anti-inflammatory drugs, the carpal tunnel release operation, and modification of the workplace and working techniques (Occupational Safety and Health Service, 1997). A number of authors (e.g. Feuerstein et al., 1993; Ranney, 1993) report success with exercise programmes involving gentle stretching, strengthening, and aerobic exercise.

The treatment methods that are effective for the localised inflammations and compression syndromes are not necessarily appropriate for pain syndromes and may in fact exacerbate the condition (Occupational Safety and Health, 1997). Treatment of pain syndromes have traditionally approached OOS as a physical/soft tissue problem or a psychological problem. However in recent times there has been a shift to addressing OOS as a sensorimotor disorder.

Physical approaches to treatment include exercises, massage, and medication including analgesics, local anaesthetics, and steroids. Psychological approaches to treatment include anti-depressants; relaxation training; pain management training; and cognitive-behavioural interventions to modify anger, frustration, and helplessness experienced as a result of their

condition; and therapy to deal with depression and anxiety (Occupational Safety and Health Service, 1997).

Therapies that address OOS as a sensorimotor disorder focus on increasing body awareness in order to relearn how to move and include sensory training and the Feldenkrais method. Sensory training involves the execution of sensory discriminative activities to reverse the effects of degradation of the primary sensory cortex. For example, activities include being able to identify shapes and locate parts of the forearm and hand by touch with eyes closed (Byl & Melnick, 1997). The Feldenkrais method is aimed at teaching people to move more efficiently by improving their ability to make distinctions. Highly structured movement explorations are used to improve the client's neuromuscular self image and thus encourage use of the whole body in movement, not just those parts that have been habitually overused (Ruth & Kegerreis, 1992).

### The Relationship between Pain and Functioning

Two important features of OOS are pain and disability. Pain has been defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (Merskey, 1979). Disability has been defined as “a disadvantage for a given individual (resulting from an impairment or a functional limitation) that limits or prevents the fulfilment of a role that is normal ... for that individual” (Tait, Chibnall & Krause, 1990, pg 171).

Whether or not there is a relationship between pain and disability or functional limitation has been subject to debate. Given that pain limits function, a number of authors have concluded that pain should be expected to vary with function; a decrease in pain means an increase in function. This relationship was supported by Shadbolt (1988) who, in an investigation of people with OOS, found that those who reported a higher level of pain were more likely to report a higher level of disability. However other authors provide evidence to contradict this finding. For instance, Waddell, Newton, Henderson, Somerville, and Main (1993), in a study of people with low back pain and/or sciatica, found that the relationship between self reported activities of daily living and severity of pain was weak with pain severity explaining only 14% of the variance in disability. They suggest that low back disability may depend on factors other than pain severity or objective physical impairment and that a large part of the variance of disability could be explained by a combination of pain severity, psychological distress, and illness behaviour.

Lane (1997) suggests that the conclusion drawn by Waddell et al. (1993) may have been premature and the contribution of pain to disability could be explained with more comprehensive measurement of pain. She investigated the relationship between disability and three pain variables: pain intensity, pain extent and pain duration with predominantly back pain and some OOS patients. She found that about 30% of the variance in disability could be explained using these three variables. However she found that although pain intensity appeared to be similar for OOS and back pain patients, there was a significant

difference in disability between the two groups with the back pain group appearing to be more disabled.

Another source of the difference between pain and disability could be the nature of the scales used. For example, participants are often asked to rate their pain on a scale from 0 (no pain) to 10 (extreme pain). It is likely that participants' ratings will be influenced by their past experience of pain and that "extreme pain" will be considered to be the worst they have ever felt and "no pain" will be the best they have ever felt. Thus a participant who has little experience of pain or injury in the past may experience a small level of disability as a high level of pain, whereas a participant who has had a greater level disability for much of their life may interpret that same sensation as a low level of pain.

The discrepancy between pain and disability could also be understood by thinking in terms of condition severity. A person with a severe condition may experience the same level of pain as a person with a milder condition by adjusting their level of functioning. For example, a person with a severe condition may be able to decrease their level of pain by avoiding vacuuming. Similarly a person with a severe condition may have the same level of functioning as a person with a milder condition by adjusting the level of pain they will tolerate. For example, they may choose to vacuum despite a significant increase in their pain levels. Thus condition severity is a combination of pain and functioning. While severity may remain constant for a given individual, pain levels may increase as functioning increases and vice versa.

Another explanation for the discrepancy between pain and functioning could be the role played by the beliefs people hold about their pain. Strong, Ashton, Cramond, and Chant (1990), in a study of chronic low back pain, found no relationship between functioning and pain intensity but found significant correlations between functioning and beliefs about pain. They, along with a number of other authors, believe that an understanding of pain beliefs is an important part of the assessment and treatment of pain problems.

# **Pain beliefs**

## **Introduction**

In this section the literature on pain beliefs and their relationship to pain and disability is reviewed. Pain beliefs are defined as the “cognitions (thoughts) patients have regarding their pain problem” (Jensen, Turner, Romano & Karoly, 1991). It is thought that people develop their own models which help make sense of their experience and determine how they cope with it. These models contain core beliefs which are thought to be interrelated. For instance, the belief that a condition can be controlled or cured is usually associated with a belief the condition will last a short time (Weinman & Petrie, 1997). According to cognitive-behavioural theory, as beliefs influence emotional and behavioural responses, beliefs can influence physical and psychosocial adjustment (Turk, Meichenbaum & Genest, 1983).

## **Types of Beliefs**

Researchers have identified several types of pain beliefs which include beliefs about cure and control, fear avoidance beliefs, beliefs about duration and persistence, the belief that pain is a mystery, and beliefs about cause.

### **Beliefs about cure and control.**

Beliefs regarding cure or control are about the extent to which the sufferer believes their condition is amenable to cure or control (Weinman, Petrie, Moss-Morris & Horne, 1996).

Many studies support the notion that people who believe they can control their pain function better. For instance, Strong et al. (1990) found that low back patients who believed they had more control over their pain reported that pain had less interference with their daily living. However the direction of the relationship was not established.

One type of control belief is the pain locus of control belief: the belief that an individual has about their ability to control their pain. The belief that one controls one's own pain reflects an internal locus of control. The belief that pain is outside of one's control reflects an external locus of control (Jensen et al., 1991). Partridge and Johnston (1989) investigated beliefs about control in a study of people disabled by stroke or wrist fracture. They found that a greater belief in personal control over recovery predicted faster and more complete recovery from physical disability although they acknowledged that the relationship between locus of control and recovery might simply reflect the patients initial degree of independence: patients who are physically more able could perceive they had control. However they allowed for this by determining their expected recovery based on their initial severity and diagnostic group.

Beliefs about cure or control are also influenced by outcome expectancies and self efficacy. Outcome expectancies are expectations regarding the consequences of specific actions. According to social cognitive theory, behaviours believed to have positive outcomes are more likely to be performed than those believed to have negative outcomes (Jensen et al., 1991). However research has only provided limited, if any, support for this

theory. For example, Jensen, Turner, and Romano (1991) found that patients' predictions about the effectiveness of particular coping behaviours were not related to the self-reported use of those behaviours.

Self-efficacy beliefs are beliefs regarding one's own ability to perform a specific behaviour. Social cognitive theory postulates that self-efficacy beliefs influence the extent to which an individual will initiate and persist with particular behaviours (Jensen et al., 1991). A person with high self-efficacy is more likely to initiate coping behaviours because they believe they will be successful. A person who believes in their own ability to affect change has more control of their life's direction. A person with low self-efficacy tends to experience more anxiety, depression, and feelings of helplessness. They may have low self-esteem and pessimistic beliefs about their own ability. When a setback occurs those with high self-efficacy recover more quickly and maintain commitment for their goals (Schwarzer, 1995).

Self-efficacy is also thought to be related to reported pain and disability. For example, Buckelew et al. (1994) found that fibromyalgia participants with higher self-efficacy reported less pain and disability. The predictive value of self-efficacy was higher than the predictive value of psychological distress and myalgic scores obtained from physical examination. Buckelew, Murray, Hewett, Johnson, and Huyser (1995) also found that self-efficacy significantly predicted self report pain and activity regardless of disease severity or psychological distress where disease severity was assessed from myalgic scores

obtained through a tender point evaluation. Again the direction of the relationship was not established in either of these studies.

Altmaier et al. (1993) suggest that fostering self-efficacy should be an explicit goal of treatment. They investigated the role of self-efficacy beliefs of low back pain patients participating in a three week rehabilitation program involving education and physical therapy plus counselling interventions of coping skills instructions. Although changes in self-efficacy beliefs during the program were not associated with improved functioning on discharge from the program, the changes in self-efficacy predicted less reported pain and better functioning six months after the program. They concluded that increasing self-efficacy beliefs enhanced long-term treatment outcomes and interventions that targeted self-efficacy should be developed and evaluated.

In some cases, the beliefs that a situation is controllable may have a negative influence. Bulman and Wortman (1997) suggest that although feelings of personal control are generally adaptive, they may lead to poor coping for individuals faced with a permanent, unmodifiable outcome.

In summary, internal locus of control reflects the extent to which a person believes they control their pain, outcome expectancies reflect the extent to which a person believes a particular activity will help control their pain, and self-efficacy reflects the degree to which a person believes they can carry out a behaviour to control their pain. For instance, a

person may believe that stretching controls pain (outcome expectancy), that it is up to them to stretch themselves (locus of control), and that they can maintain a programme of stretching (self-efficacy). However, if it turns out for instance that stretching does not influence pain, then this could lead to poor coping.

#### Beliefs about cause

Patients differ in their beliefs about the cause of their pain; some blame others, some take the blame themselves. Williams and Thorn (1989) found that participants in their study (industrially injured workers from a multi-disciplinary rehabilitation centre receiving compensation benefits) rarely blamed themselves for their pain yet at least 25% of participants in other medical populations do. They suggest that injured workers may benefit more from blaming others than other pain patients. However the fact that they are receiving compensation benefits may indicate an admission of some responsibility by the industry and, as suggested by Bulman and Wortman (1977), people were less likely to blame others if they are voluntarily engaged in an activity they enjoy such as contact sport, at the time of the accident.

Authors have debated the value of self-blame in coping with accident or illness. Some suggest that blaming oneself is destructive. People's motivation to maintain their self-esteem could cause them to lay the blame on external factors, rather than their own shortcomings (Bulman & Wortman, 1977). The degree to which self blame aids coping may depend on perceived avoidability. Bulman and Wortman (1977) found that accident victims who blamed themselves coped better if they believed they could not have avoided

the accident. They suggest a person copes best if the accident follows inevitably or logically from a voluntary activity.

### Fear avoidance beliefs

Many treatment programmes for chronic pain include increasing physical activity. However, some authors suggest that some sufferers are afraid to increase activity. This fear has been attributed to beliefs formed, in part, during the acute phase of the injury. In the acute phase of pain, avoidance behaviours such as resting and limping may reduce pain. However, beyond the acute phase it is believed that these behaviours may continue in anticipation of pain rather than in response to it. Avoidance of activity can have negative consequences such as loss of fitness and muscle strength (Vlaeyen, Kole-Snijders, Boeren & Van Eek, 1995).

Waddell et al. (1993) believe that fear avoidance beliefs may be a significant factor in low back pain. They describe “avoidance learning” where pain is reduced by avoiding behaviour which results in negative reinforcement. Avoidance behaviour is based on anticipated consequences and so little reinforcement is needed to maintain behaviour. In a study of people with low back pain they found that fear avoidance beliefs about work accounted for 23% of the variance of disability in daily living activities over and above biomedical measures. Fear avoidance beliefs seemed to increase with uncertainty about diagnosis rather than with pathological severity. They concluded that it is the “patient’s beliefs rather than the underlying physical reality which govern behaviour”. They claim that patients’ perceptions of their physical capacity is generally lower than their actual

performance. However, Rachman and Lopatka (1988), in a study of people with chronic arthritis, found their subjects tended to estimate the amount of pain they would later experience doing physical exercise with considerable accuracy.

Vlaeyen et al. (1995) use the term “kinesiophobia” which is “an excessive, irrational, and debilitating fear of physical movement and activity resulting from a feeling of vulnerability to painful injury and (re)injury”. They investigated kinesiophobia with chronic low back pain patients using the Tampa Scale for Kinesiophobia. This scale purports to measure kinesiophobia by having participants rate how much they agree with items such as “I am afraid that I might injure myself if I exercise”. Participants were required to lift a 5.5 kg bag and hold it until pain or physical discomfort made it impossible to continue. Heart rate and skin conductance level were used as measures of psychophysiological arousal which was also used to measure fear. However lifting a 5.5 kg bag is a static exercise, not a dynamic exercise, which involves not only movement but sustained muscle contractions. It is conceivable that the physiological responses were caused by movement (which increases circulation and heart rate) and muscle contractions (which can reduce blood supply to the muscles (Owen, 1985)) which causes pain (Gamsa, 1994) and a sharp rise in blood pressure (Hanna, 1988). They found no significant correlation between kinesiophobia and measures of physiological arousal although they offered the explanation that behavioural avoidance occurred before arousal levels increased, i.e. participants may have considered that short term avoidance could prevent injury or increased pain in the long run. They also found that patients who reported fear of movement (re)injury were

more anxious after the activity than before. They believed that this underscored the findings that with phobics the closer the confrontation with the feared stimulus, the higher the fear reported.

#### Beliefs about duration and persistence

Research has suggested a relationship between patients perceptions of the likely duration and persistence of their health problems, subjective reporting of pain, and how patients manage their pain condition. For instance, Williams and Keefe (1991) collected data from 120 chronic pain patients on the Pain Management Program at Duke University Medical Centre. Sixty-one percent of their participants suffered from lower back pain. They found that participants who believed the pain would persist and was an unexplained mystery were less likely to use cognitive coping strategies (e.g. reinterpreting the pain sensation), tended to catastrophize more, and were less likely to consider their coping efforts as effective in managing pain.

Williams and Thorn (1989) found that chronic pain patients who strongly believed their pain would persist showed poor compliance with physical and behavioural interventions aimed at managing pain. They also found the belief that pain would be enduring was positively associated with subjective reporting of pain intensity. However the actual pain duration showed no relationship with the belief that pain would endure, or with subjective pain intensity. The belief that pain would be enduring was more related to subjective pain

intensity. Williams and Thorn concluded that beliefs play an important role in subjective pain reporting.

#### Belief that pain is a mystery

Research has suggested a relationship between an understanding of the pain condition and how participants respond to the condition. For instance, Strong et al. (1990) found there to be a relationship between dysfunction and the belief that pain is a mystery. Williams and Thorn (1989) found that participants who believed their pain to be an unexplained mystery had lower self esteem, high somatization levels, experienced more psychological distress, and complied less with treatment than participants who thought they understood their pain. They felt that participants who lacked an understanding of their pain may have viewed sore muscles brought about by physical therapy to be counterproductive.

#### Unrealistic optimism

While there is evidence to suggest that positive beliefs produce desirable outcomes such as better functioning and decreased pain reporting, sometimes people can be overly optimistic. In the area of illness prevention, an optimistic appraisal of one's ability to cope can initiate preventive action but unrealistic optimism can represent a defensive distortion that undermines preventive action. Recognising personal vulnerability is a prerequisite to avoiding risks and those who feel vulnerable are more responsive to education messages and are more likely to change behaviour (Schwarzer, 1995). If participants are overly optimistic about their condition (for instance, a subject who believes the condition will

last a short time when in fact it is long term) they may not take the steps required for effective rehabilitation.

## Cognitive-Behavioural Interventions

The relationship between beliefs and attitudes and functional ability and pain has been part of the rationale behind the use of cognitive-behavioural interventions to treat chronic pain patients. Cognitive interventions aim to change the way people think about their pain and to increase their feeling of control. According to cognitive theorists, modifying patients' beliefs will generate changes in their experience of pain. A combination of cognitive and behavioural therapy aim to help patients change the way they think as well as increase their activity levels (Gamsa, 1994).

Many studies report the positive effects of cognitive-behavioural interventions with chronic pain. Commonly reported results are a decrease in disruptions of daily living and subjective feelings of pain (e.g. Swerissen, Matyas & Thomas, 1991) and a stronger belief in the ability to control pain (e.g. Turner, Whitney, Dworkin, Massoth & Wilson, 1995). Treatment has also helped people with low back pain to reduce medication intake, increase physical activity, and return to normal functioning (Altmaier, Russell, Kao, Lehmann & Weinstein, 1993).

However positive results of interventions have not tended to last over time. For example, Swerissen, Matyas, and Thomas (1991) investigated the efficacy of cognitive-behavioural

therapy combined with movement retraining in participants with occupational overuse injuries. They found disruption of daily living and pain were reduced immediately following the treatment but these effects were not maintained at a three-month follow-up. Turner et al. (1995) in a study of patients with temporomandibular disorder (TMD) found there was only a small difference in feelings of pain and function that could be attributed to cognitive-behavioural interventions at three-month follow up and virtually no difference at 12-month follow-up.

Spence (1991) conducted a two year follow-up of participants with chronic occupational pain of the upper limbs who had undertaken cognitive-behavioural therapy. She found significant improvements compared to pre-treatment levels on depression, coping strategies, pain levels, and distress caused by pain. However, she found that very few clients were pain-free and suggested improvements could have been due to natural recovery. She stated that although cognitive-behavioural interventions enhance the ability to cope with pain they are not a cure.

Many of the studies reporting positive effects of interventions combined physical interventions with the cognitive-behavioural interventions (e.g. Swerissen, Matyas & Thomas, 1991) so it is unclear whether the physical interventions or cognitive-behavioural interventions reduced pain reporting. Altmaier, Lehmann, Russell, Weinstein, and Kao (1992) compared standard rehabilitation emphasising physical therapy and reconditioning with standard rehabilitation plus cognitive-behavioural therapy to see if psychological

techniques were enhancing outcomes. They found no significant differences between the two treatments on physical function, pain interference with usual life activities, and employment.

### Limitations of Beliefs Research

A number of studies (e.g. Turner et al., 1995; Williams & Thorn, 1989) have found specific pain beliefs to be associated with self reported pain and physical functioning. The assumption seems to be that the beliefs are affecting the pain and functioning, however there are a number of alternative explanations. Beliefs may be affecting the reporting of pain but not the actual pain or functioning. A person with positive beliefs may be less inclined to report high levels of pain than an individual with negative beliefs. Alternatively, it could be the level of functioning and pain, and past experience of functioning and pain that are determining the beliefs. For example, whereas Williams and Thorn (1989) concluded that a relationship between beliefs and pain intensity indicated that beliefs played an important role in pain reporting, an alternative interpretation is that pain plays an important role in beliefs. For example, when pain is very intense it may be difficult for participants to imagine it will ever go away. Similarly Vlaeyen et al. (1995) suggested that increased anxiety after activity suggested that activity caused anxiety. However another explanation could be that participants were experiencing more pain after the activity than before and it was in fact the pain that increased anxiety.

It may be less appropriate to regard beliefs as negative or positive than to look at how accurate they are. Beliefs that are negative for one subject or one diagnosis may be realistic for another and encouraging false hopes could be detrimental to rehabilitation. Most studies of OOS group people with OOS together, yet clearly there are a number of types of conditions that fall under the OOS umbrella and the prognosis (and hence the nature of realistic beliefs) for these conditions is variable. Realistic beliefs for one diagnosis or type may be unrealistic for another. For example, whereas a person could expect to recover in the short term from a mild, localised condition by undergoing standard treatment, this could be an unrealistic expectation for someone with a more severe diffuse condition. A person with a localised condition may be able to return to their previous occupation after a brief rest, whereas the person with a diffuse condition may be better off in the long term putting their resources into vocational rehabilitation.

This however leaves the difficulty of determining the nature of realistic beliefs. A common assumption in the studies on beliefs is that some beliefs are unrealistic yet this makes the assumption that the researchers know what are realistic beliefs and what are not. These studies rely on physical assessments to determine what the actual level of pain or functioning should be, yet research where physical assessments are made is always limited by the measures available. As medical tests have their limits we cannot assume that because a test indicates there is no or little disability, there is no or little disability. For instance, Waddell et al. (1993) found that fear avoidance beliefs were able to predict a significant proportion of variance over and above biomedical measures. In their case the

clinical assessment included a standard medical history, a review of the hospital records, and an assessment of the anatomical pattern, time pattern and severity of the pain using subjective pain reporting. The assumption here seems to be that the assessments they used were able to give an accurate picture of what was causing the pain, yet there is no information to state what tests were used. Vlaeyen et al. (1995) state that the participants in their study “had minimal organic findings or displayed pain complaints that were disproportionate to the demonstrable organic basis of their pain”, yet there is no documentation of the assessment procedures used. With the limited documentation and the limitations of diagnostic tests, there is little information on the nature of the experimental group. With current theory, a thorough assessment should involve at least measures of tissue damage, muscle bracing, vibration sensitivity, nerve entrapment, hand temperature, and cortical control.

Much of the pain beliefs research uses cognitive-behavioural interventions and short term improvements in pain and functioning have been reported. However, as the results of most studies rely on subjective reporting it is difficult to know whether there have been any objective improvements. Changing a person’s beliefs may affect the person’s appraisal of the pain but this does not necessarily imply physical or functional improvement. It could be that the intervention has changed the perceptions of functioning and pain in the short term without changing the underlying physical condition. Alternatively participants may have reported changes in beliefs, pain, and functioning because implicit in cognitive-behavioural training is the idea that positive beliefs and reduced pain are socially desirable

responses. Few, if any, studies investigate the relationship between perceptions of improvement and beliefs without interventions. Before it can be concluded that interventions to change beliefs are effective in improving pain and functioning, it is necessary to understand the relationship between beliefs and recovery.

## **Aims and Hypotheses**

OOS has been a major problem for people with OOS, employers, and insurance companies. Interventions aimed at changing beliefs have been part of a treatment regime yet the strength of the relationship between beliefs and changes in functioning, between beliefs and changes in pain, and between pain and functioning has not been established.

If we take disability to be the interaction of pain and functioning, improvements in functioning may not necessarily imply improvements in pain; in fact the reverse may be true. To gain a better understanding of the relationship between pain beliefs and changes in functioning, it may be appropriate to look at the relationship between pain beliefs and the interaction of pain and functioning.

Authors have suggested that an accurate differential diagnosis will help to determine what is the most effective treatment for each condition and reduce confusion for the client. To assist with this, ACC has provided a classification system for the different types of OOS conditions some of which are presumed to be easy to treat; others more difficult.

However the difficulties of making an accurate diagnosis have been discussed. With pressure on doctors to meet the needs of the client who is sometimes the patient and sometimes the insurance company coupled with the fact that there is usually a lack of objective data, clients may not always agree with the diagnosis. If a client does not agree with the diagnosis it is unlikely to be of much value in reducing confusion.

This project is a preliminary investigation into the relationship between beliefs about OOS, diagnosis, and perceptions of changes in pain and functioning for people with OOS. It will not determine whether or not the relationship is causal but will help determine which direction further research should take. Understanding the nature of the relationship between beliefs and recovery may help in the modification of interventions aimed at changing patients' beliefs.

As interventions may have influenced results of beliefs research in the past, this study does not include an intervention. Also, bearing in mind the limitations of assessments, this study does not attempt to make judgements about the accuracy of people's pain and functioning reporting or to make comparisons between participants who may have very different conditions. The focus is on perceived changes of function and pain within individuals.

The aims of the present study are to investigate the relationship between beliefs about pain and perceptions of recovery, the relationship between pain and functioning, and the relationship between beliefs and diagnosis.

The hypotheses of the present study are:

1. Perceived changes in functioning will be positively related to pain beliefs.
2. Perceived changes in pain will be positively related to pain beliefs.
3. Perceived changes in functioning and perceived changes in pain together will be positively related to pain beliefs.
4. Perceived pain will not vary with perceived functioning.
5. The belief that the participant has an accurate diagnosis will be negatively related to the belief that pain is a mystery.
6. Beliefs about pain will be related to diagnostic type.

## Method

### Participants

The participants were people who had been diagnosed as having had OOS for at least six months and were obtained from a variety of sources as shown in Table 1.

Table 1

#### Sources of participants

Sources	No. of participants	%
Doctor	2	3.1
Physiotherapist	9	14.1
Chiropractor	4	6.3
Occupational therapist	5	7.8
Massage therapist	2	3.1
Move over OOS	15	23.4
Other exercise programmes	4	6.3
Support groups	7	10.9
Other	16	25.0
Total	64	100.0

Most of the participants were recruited through rehabilitation specialists (34.4%) and exercise programmes (29.7%) including the “Move over OOS” programme, a voluntary exercise and recreation programme set up by the Wellington City Council and Wellington OOS Support Group. Of 175 questionnaires distributed for recruitment of participants, 64 were returned.

As many people with OOS have received negative attention from ACC and judgements from others, personal information was kept to a minimum in order to make participants feel safe. For this reason no information was collected about age or gender.

### Procedure

A draft information sheet and questionnaire were distributed to five people with OOS for piloting. Each member of the pilot group was asked to comment on how long it took to complete, whether or not they could understand it, and how difficult it was to complete. Changes made to the questionnaire as a result of the pilot participants’ recommendations are described in the Measures section.

After the amendments had been made and approval had been granted by the Massey University Human Ethics Committee, the information sheet (Appendix A) and questionnaires (Appendix B) were distributed to OOS support groups, a general practitioner, physiotherapists, acupuncturists, an occupational therapist, a massage therapist, two workplaces, and three exercise rehabilitation providers. The information

sheet and questionnaires were passed on to clients with OOS who were interested in taking part in the study. The questionnaire stated "It is assumed that, by filling out the questionnaire, you consent to taking part in the research." Participants returned the questionnaires by Freepost envelope.

## The Measures

Each questionnaire consisted of three sections: (a) a diagnostic history, (b) a measure of perceived improvement in pain and function, and (c) a measure of beliefs. At the end of each section participants were invited to comment.

### Diagnostic history

This section identified how long ago participants were diagnosed as having OOS, what specific diagnoses they had been given, how accurate they believed these diagnoses to be, and how often they had experienced pain in the past.

To determine how long participants had had OOS they were asked to identify when they were first diagnosed as having OOS from one of the following:

1. one to six months ago
2. six to twelve months ago
3. twelve months to two years ago
4. two to six years ago
5. six to ten years ago
6. more than ten years ago.

Participants were also required to provide any specific diagnoses they had been given and specify whether or not they thought they were accurate. Using their responses, two diagnostic variables were derived for each participant. The first diagnostic variable distinguished between pain syndromes and localised inflammations or compression syndromes as shown in Table 2.

Table 2

Definitions of values of Diagnostic Variable 1

Value of Diagnostic Variable 1	Participant response
pain syndrome	the participant entered at least one diagnosis that fitted the ACC classification of pain syndrome
localised inflammation or compression syndrome	the participant had no pain syndrome diagnosis but at least one diagnosis that fitted the ACC classification of localised inflammation or compression syndrome
unclassified diagnosis	the participant had no diagnosis fitting the ACC classification of pain syndrome, localised inflammation, or compression syndrome

Note. The ACC classification is taken from Occupational Safety and Health Service (1997).

The second diagnostic variable reflected the ACC classification system by distinguishing between pain syndromes, localised inflammation, compression syndrome, mixed diagnosis, unclassified diagnosis, and no diagnosis as shown in Table 3.

Table 3

Definitions of values of Diagnostic Variable 2

Value of Diagnostic Variable 2	Participant response
localised inflammation	at least one diagnosis fitting the ACC classification of localised inflammation and no compression syndrome or pain syndrome
compression syndrome	at least one diagnosis fitting the ACC classification of compression syndrome and no localised inflammation or pain syndrome
pain syndrome	at least one diagnosis fitting the ACC classification of pain syndrome and no localised inflammation or compression syndrome
mixed diagnosis	any combination of localised inflammation, compression syndrome, and/or pain syndrome
unclassified	one or more diagnoses were provided but they did not fit the ACC classification of localised inflammation, compression syndrome, or pain syndrome
no diagnosis	no diagnosis was provided

Note. The ACC classification is taken from Occupational Safety and Health Service

(1997).

To calculate the number of participants with a diagnosis they perceived to be accurate, a variable "Accuracy" was given a value of "yes" for participants who perceived at least one

diagnosis to be accurate and "no" for participants who did not perceive any diagnoses to be accurate.

Participants were also asked to report how often they had experienced pain such as headache or back pain prior to developing OOS. Responses were recorded on a Likert scale ranging from 1 (Never) to 5 (All the time).

#### Measures of perceived improvement in pain and function

To measure changes in pain and function, a number of variables were developed: Current Function, Past Function, Function Improvement, Current Pain, Past Pain, Pain Decrease, and Total Improvement. The values for these variables were established in Items 5 to 28 in which participants were asked to report on a scale of 0 to 10 how their OOS had impacted on their life. Table 4 shows which items were used for each variable.

Table 4

Pain and function variables, value ranges, and questionnaire item nos.

Variable	Item nos.	Value range
Current Function	5 to 15	0.0 to 10.0
Past Function	17 to 27	0.0 to 10.0
Function Improvement	5 to 15, 17 to 27	-10.0 to 10.0
Current Pain	16	0.0 to 10.0
Past Pain	28	0.0 to 10.0
Pain Decrease	16, 28	-10.0 to 10.0
Total Improvement	5 to 28	-20.0 to 20.0

To establish Current Function, participants were asked to report how much their life was currently disrupted in the following areas: family/home responsibilities, recreation, social activity, occupation, personal care, lifting, walking, sitting, standing, sleeping, and typing. Current Function was the mean score of the responses to these items.

To establish Past Function, the same scales were used but participants were asked to report how much their life was disrupted six months ago. Past Function was the mean score of these responses.

Function Improvement was established by subtracting Current Function from Past Function.

To establish Current Pain, participants were asked to report how much pain they typically experienced.

To establish Past Pain, participants were asked to report how much pain they typically experienced six months ago.

Pain Decrease was established by subtracting Current Pain from Past Pain.

Total Improvement was a measure of how much participants had improved in both pain and functioning. It was established by adding Function Improvement and Pain Decrease.

The items for all the pain and function variables were derived from the Pain Disability Index (PDI) (Tait, Chibnall & Krause, 1990) which measures disability caused by pain. The PDI asks participants to rate on a scale from 0 to 10 how much pain interferes with functioning in the following areas: family/home responsibilities, recreation, social activity, occupation, sexual behaviour, self care, and life support activity.

A total score is derived by adding the scores for each item. The total score can range from 0 to 70. The PDI has been found to have reasonable internal consistency (Cronbach's  $\alpha = 0.87$ ), test-retest reliability, and concurrent and construct reliability (Strong et al., 1990).

Tait, Chibnall, and Krause (1990) also provided support for the validity, reliability and internal consistency. However test-retest reliability ( $r=0.44$ ,  $p<0.001$ ) was lower than expected. Scores were obtained from 46 pain patients at two intervals approximately two months apart. There seemed to be significant random variation in the PDI scores over the two month period. The authors considered this problematic as disability status is generally viewed as a stable construct. However in conditions such as OOS and back pain, research has shown change in disability status amongst some individuals; this change is one of the variables being measured in this study.

Tait, Chibnall, and Krause (1990) also concluded that the tool had concurrent validity as the PDI scores were significantly related to patient reports of psychological distress, pain severity, and other items used to measure pain-related disability. Multiple regression analysis provided support for construct validity with PDI scores being associated with factors relevant to physical dysfunction including pain-related interference with activity (e.g. bed rest), symptom complex (e.g. pain extent and severity), satisfaction with life activities, employment, and education.

For the current study, a number of changes were made to the original PDI in response to feedback from the pilot group. The question about sexual behaviour was removed as sexual behaviour is dependent on the behaviour or presence of a sexual partner. Self care and life support activities were replaced with more specific activities such as lifting and walking. Typing was added to the scale as ability to type is affected in many OOS cases

yet people often work around this by using a typist or voice recognition software. As this study attempts to get a measure of improvement in function and not management of the condition, it seemed that "typing" would provide more specific information than "occupation".

In the original version of the PDI, participants are asked how much pain is preventing them from doing what they "would normally do". One of the pilot participants commented that it has been nearly six years since she's done things "normally" so this was changed to what they "could previously do". Similarly in the original version participants are asked to report on how much their pain disrupts "activities that are a part of or directly related to" their job. One pilot subject reported that her response related to her pre-OOS occupation. As many participants could be now out of work or have changed occupations and these changes could have taken place over the past six months, this was changed to "activities that were part of your job".

#### A measure of beliefs

To measure pain beliefs the following variables were developed: Persistence, Mystery, Self-blame, Movement, Control/cure, and Time.

The values for these variables were established in questions 29 to 70 in which participants were presented with a series of statements about their condition. Table 5 shows which items were used for each variable. Participants were required to rate how much they agreed with each statement on a Likert scale ranging from 1 (strongly disagree) to 5

(strongly agree). The score for each of the pain beliefs variables was the mean of the sum of the items for that variable giving a score range of 1.00 to 5.00. Reverse-scored items represented negative beliefs so that a higher score indicated a more positive belief.

Persistence was a measure of how much the participant believed that the pain would persist in their life. A high score on Persistence meant that the participant did not believe that the pain would persist in their life.

Mystery was a measure of how much the participant believed that the pain was mysterious and poorly understood. A high score on Mystery meant that the participant did not believe that their pain was mysterious to them.

Self-blame was a measure of how much the participant believed that they caused or maintained the pain. A high score on Self-blame meant that the participant believed that they caused or maintained the pain. As there was controversy in the literature about whether or not Self-blame was positive, two self-blame variables were developed, Self-blame and Self-blame-reversed. Self-blame-reversed was the opposite of Self-blame. A high score on Self-blame-reversed meant that the participant did not believe that they caused or maintained the pain.

Originally Movement was thought to be a measure of how much the participant feared movement thus a high score on Movement was thought to mean that the participant did not fear movement. This interpretation was later changed as shown on page 53.

Control/cure was a measure of how much the participant believed that they controlled their condition. A high score on Control/cure meant that the participant believed that they controlled their condition.

Time was a measure of how long the participant believed that the condition would last. A high score on Time meant that the participant believed that their condition would last a short time.

Table 5

Internal reliability scores for pain beliefs variables

Variable	Item nos.	No. of items.	Alpha
Persistence	31, 37, 40, 43, <u>30</u> , <u>33</u> , <u>34</u> , <u>38</u> , <u>44</u>	9	.86
Mystery	<u>29</u> , <u>32</u> , <u>36</u> , <u>42</u> ,	4	.82
Self-blame	35, 39, 41	3	.86
Self-blame-reversed	<u>35</u> , <u>39</u> , <u>41</u>	3	.86
Movement	48, 52, 56, 60, <u>45</u> , <u>46</u> , <u>47</u> , <u>49</u> , <u>50</u> , <u>51</u> , <u>53</u> , <u>54</u> , <u>55</u> , <u>57</u> , <u>58</u> , <u>59</u> , <u>61</u>	17	.75
Control/cure	62, 63, 65, 67, <u>64</u> , <u>66</u>	6	.82
Time	68, <u>69</u> , <u>70</u>	3	.76

Note. Underlined items were reverse-scored.

An internal reliability analysis on the data for this study showed all the pain beliefs variables to have reasonable internal reliability as shown in Table 5. However the reliability of Movement was less than the other variables with a coefficient alpha of .75. An item total correlation of Movement showed negative corrected item total correlation values for Item 52 - "Just because something aggravates my pain does not mean it is dangerous." (-.25), Item 57 - "Pain lets me know when to stop exercising so that I don't injure myself." (-.06) and Item 60 - "Even though something is causing me a lot of pain, I don't think it's actually dangerous." (-.17). These items differed from the other items making up the Movement variable in that they represented the belief that the participant should persist with an activity even if it causes pain. Thus it became clear that a high score

on Movement should theoretically mean the participant does not fear movement even if it causes pain. However, as it was found to be unreliable, it was removed from the study and a new variable (Movement2) was created. Movement2 was derived from the Movement variable with items 52, 57, and 60 removed. A high score on Movement2 means the participant does not fear movement but gives no information on whether or not a participant avoids movement if it causes pain. Movement2 was found to have a reasonable internal reliability with a coefficient alpha of .84.

The Persistence, Mystery and Self-blame variables were derived from the Pain Beliefs and Perceptions Inventory (PBAPI). The PBAPI (Williams & Thorn, 1989) measures participants' beliefs about their pain and is divided into three dimensions: (a) Time - the belief that pain will persist in the participant's life, (b) Mystery - the perception that the pain is mysterious and poorly understood, and (c) Self-blame- the belief that the participant caused and/or maintains the pain. Coefficient alpha ratings suggested that each of the dimensions has satisfactory internal reliability (alpha = .65 to .80 ). The original inventory contains 16 items that measure the degree to which the subject agrees with each item on a four point Likert scale (Williams & Thorn, 1989). For the current study, participants were asked to respond on a five point scale for all items to ensure consistency and enable participants to neither agree nor disagree.

The original Movement variable (and thus Movement2) was derived from the Tampa Scale for Kinesiophobia (TSK). The original TSK was developed by Miller, Kori, and Todd

(1991) to measure fear of movement/(re)injury (Vlaeyen et al., 1995). Vlaeyen et al (1995) found the Cronbach's alpha to be .77.

The original Tampa scale contained the item "My pain would probably be relieved if I were to exercise." Two of the respondents from the pilot group commented that they were already exercising and there seemed to be an assumption that they were not, so this item was changed to "My pain is probably relieved by exercise." Similarly, with Item 56, two of the respondents felt there was an assumption they were inactive. In the original Tampa scale this was worded "Although my condition is painful, I would be better off if I were physically active." This was changed to "Although my condition is painful, I am better off when I am physically active."

One respondent from the pilot group felt that Item 59 - "I can't do all the things normal people do because it is too easy for me to get injured" made the assumption that they were abnormal. For this item the word "normal" was changed to "other".

One respondent also criticised the use of the word "dangerous" in Items 47, 52, 55 and 60 and suggested it be changed to "damaging" as she felt "dangerous" was too sensational. However this was not changed as this could alter the original meaning of the question.

The Control/cure and Time variables were derived from The Illness Perception Questionnaire (IPQ). The IPQ was developed by Weinman et al. (1996) to assess

cognitive representations of illness. It consists of five scales: (a) Identity – the symptoms the subject associates with the illness, (b) Cause – personal views on aetiology, (c) Timeline – the perceived duration of the illness, (d) Consequences – the expected effects and outcome, and (e) Control/Cure – how the subject controls or recovers from the illness (Weinman et al, 1996). The items are presented on a five point scale ranging from “strongly disagree” to “strongly agree”. Data collected by Weinman et al. (1996) show the IPQ scales to have good internal consistency ( $\alpha = .73$ ) and test-retest reliability over one month ( $r = .49 - .68$ ), three months ( $r = .51 - .54$ ), and six months ( $r = .36 - .46$ ). Weinman et al. also report evidence of validity.

For the present study, the Timeline (three items) and the Control/cure (six items) scales were used and the word “illness” was replaced with “OOS”. Three people from the pilot group commented that the beliefs section of the questionnaire seemed to make assumptions that didn’t fit their experience or it was difficult to either agree or disagree totally and they felt they needed to add comments. Because of this, spaces were left at the end of each section so that respondents could qualify their responses if necessary.

### Analysis of the Responses

The Statistics Package for Social Sciences (SPSS) version 9 was used to perform all statistical analyses.

Frequencies and means were obtained for all continuous variables and frequencies obtained for nominal variables in order to provide a description of the population.

Hypotheses 1, 2, and 3 were tested using the Pearson Correlation Coefficient to establish whether there were significant correlations between beliefs about pain and reported changes in pain and function.

Hypothesis 4 was tested using the Pearson Correlation Coefficient to establish whether there was a significant correlation between pain and function.

Hypothesis 5 was tested using the Spearman Correlation Coefficient to establish whether there was a significant difference in the mean scores of the Mystery variable between participants who scored a “yes” for the Accuracy variable and participants who scored a “no”.

One tailed tests of significance were performed for Hypotheses 1 to 5 which made predictions of positive relationships.

To test Hypothesis 6, analyses of variance (ANOVAs) were performed between the diagnostic variables and the pain beliefs variables and the Scheffe test of significance was applied.

Correlations between the pain beliefs variables were investigated and two tailed tests of significance were performed.

## Results

### Descriptive Characteristics of the Sample

#### Length of time with OOS

Most of the participants had had OOS for between one and six years as shown in Table 6.

Table 6

#### Length of time since first diagnosis

Length of time	No. of participants	%
1 to 6 months	2	3.1
6 to 12 months	11	17.2
12 months to 2 years	21	32.8
2 to 6 years	18	28.1
6 to 10 years	10	15.6
more than 10 years	1	1.6
missing result	1	1.6
Total	64	100.0

#### Diagnosis

Only 18 (28.2%) of the participants had been given at least one diagnosis fitting into the classification system provided by ACC (Occupational, Safety and Health Service, 1997) as

shown in Table 7. The rest had either no diagnosis or a diagnosis that did not fit into the classification.

Table 7

Number of participants fitting ACC classification system using Diagnostic Variable 2

Type of condition	No. of participants	%
localised inflammation	6	9.4
compression syndrome	3	4.7
pain syndrome	6	9.4
mixed diagnosis	3	4.7
unclassified	15	23.4
no diagnosis	31	48.4
Total	64	100.0

Nineteen of the participants (29.7%) had been given at least one diagnosis which they perceived to be accurate leaving 70.3% without a diagnosis with which they agreed.

Pain and functioning

The number having experienced frequent pain prior to developing OOS was 13 (21%) as shown in Table 8. A larger proportion, 21 (33.9%), had never or hardly ever experienced pain before developing OOS.

Table 8

Frequency of prior pain

Frequency of pain	No. of Participants	%
Never	15	24.2
Hardly ever	6	9.7
Sometimes	28	45.2
Frequently	13	21.0
All the time	0	0.0
Total	62	100.0

Most of the participants had had little change in function or pain levels. However, an examination of the distributions showed that current pain was reasonably normally distributed whereas pain six months ago was negatively skewed suggesting there had been some improvement in pain levels.

The greatest disruption to daily living was found in the area of typing with a mean of 6.7 and negatively skewed results as shown in Figure 1.

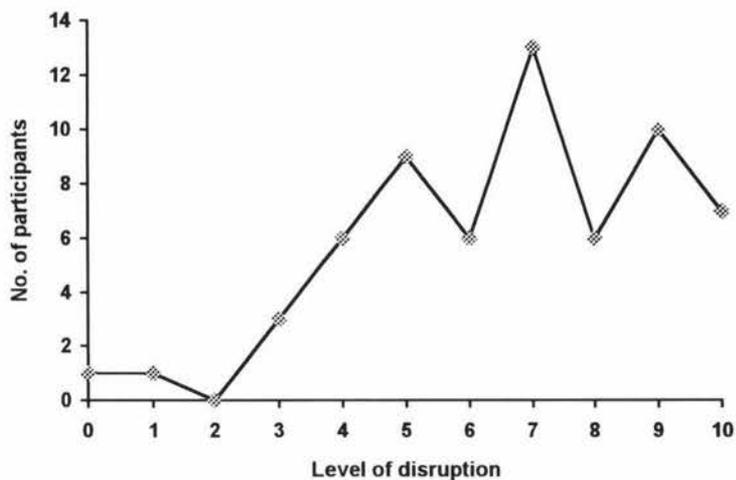


Figure 1. Graph showing reported levels of disruption to typing

The least disruption to daily living was found in the area of walking with a mean of 1.3 and positively skewed result as shown in Figure 2.

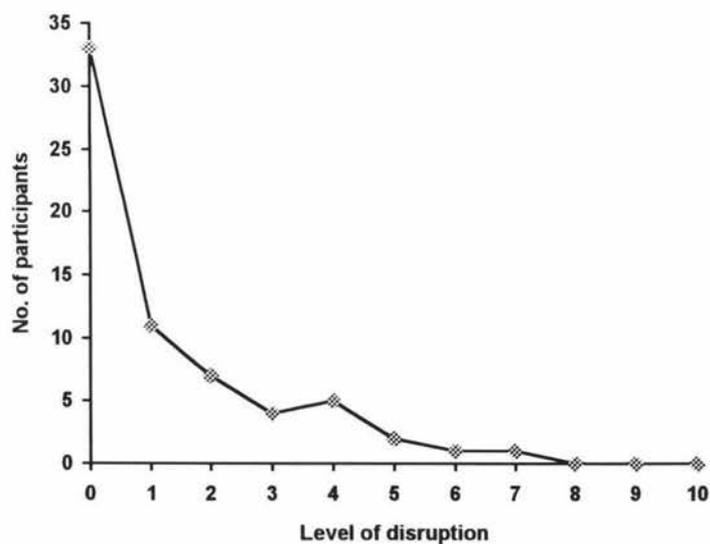


Figure 2. Graph showing reported levels of disruption to walking

## Beliefs

Minimum and maximum values, means and standard deviations for the belief scores of the present sample are shown in Table 9.

Table 9

### Beliefs scores

Variable	Min.	Max.	Mean	<u>SD</u>
Persistence	1.67	4.78	3.16	.77
Mystery	1.50	5.00	3.22	.98
Self-blame	1.00	4.00	2.35	.97
Self-blame-reversed	2.00	5.00	3.65	.97
Movement2	1.79	4.50	3.33	.60
Control/cure	2.50	5.00	3.94	.62
Time	1.00	4.00	2.47	.72

The means for most of the beliefs scores were above 3.0 (the range of possible scores is 1 to 5) with the exception of Time with a value of 2.47.

The highest mean was for Control/cure with a value of 3.94. Although the scores on Control/cure were positive, nine of the sixty four participants commented that they did not believe full recovery was possible; their emphasis was on control, not cure. Comments

included “Symptoms can be intermittent but the condition is such that there will always be an area of weakness which can easily be aggravated “and” I will probably always have to be careful but I hope to one day be pain-free.” A closer look at the items that made up the Control/cure variable showed that 78.1% answered positively on Item 63 - “There is a lot which I can do to control my symptoms” whereas only 48.5% answered positively on Item 65 - “My treatment will be effective in curing my OOS”, the only item on the Control/cure variables relating to cure. A reliability analysis of the Control/cure variable showed Item 65 to have the lowest corrected item total correlation for this variable with a value of .42.

Other beliefs items that caused comment were those making up the Movement2 variable which used the term “exercise”. For instance, one participant didn’t complete this because although swimming relieved pain, squash made it worse. Another participant made the comment that although walking and running are fine, weights are not. Another pointed out the importance of doing the right exercise at the right time; of knowing when to rest an inflamed joint and when to gently stretch it.

## Hypothesis Testing

### The relationship between beliefs and recovery

To test the first hypothesis, that perceived changes in functioning will be positively related to pain beliefs, correlations were performed between Function Improvement and each of the pain beliefs variables as shown in Table 10. The results showed no significant correlation.

To test the second hypothesis, that perceived changes in pain will be positively related to pain beliefs, correlations were performed between Pain Decrease and each of the pain beliefs variables as shown in Table 10. The results showed a significant correlation between Persistence and Pain Decrease ( $r(63) = .22, p < .05$ ).

To test the third hypothesis, that perceived changes in function and perceived changes in pain together will be positively related to pain beliefs, correlations were performed between Total Improvement and each of the pain belief variables as shown in Table 10. The results showed no significant correlation.

Table 10

Correlations between pain beliefs and recovery

	Function Improvement	Pain Decrease	Total Improvement
Persistence	.13	.22*	.20
Mystery	.13	.04	.08
Self-blame	.17	.14	.16
Self-blame- reversed	-.17	-.14	-.16
Movement2	.19	.13	.16
Control/ cure	.20	.19	.20
Time	.50	.13	.10

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

The relationship between pain and functioning

To test the fourth hypothesis, that perceived pain will not vary with perceived functioning, correlations were performed between Current Function and Current Pain and between Past Function and Past Pain as shown in Table 11. The results showed significant correlations for both Current Function and Current Pain ( $r(64) = .66, p < .01$ ) and for Past Disability and Past Pain ( $r(63) = .49, p < .01$ ). An additional finding was that correlations were significant between all pain and function variables.

Table 11

Correlations between pain and function variables

	Current Function	Current Pain	Past Function
Current Pain	.66**		
Past Function	.77**	.53**	
Past Pain	.50**	.67**	.76**

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

The relationship between diagnosis and pain beliefs

To test the fifth hypothesis, that the belief that the diagnosis is accurate is negatively related to the belief that pain is a mystery, a t-test was performed on the difference between the mean Mystery scores of those who believed that their diagnosis was accurate ( $M = 3.41$ ,  $SD = .99$ ) and the mean Mystery scores of those who did not believe that their diagnosis was accurate ( $M = 3.14$ ,  $SD = .98$ ). The results showed no significant relationship.

To test the sixth hypothesis, that beliefs about pain are related to diagnostic type, two ANOVAs were performed. The first ANOVA tested the relationship between Diagnostic Variable 1 and each of the pain belief variables. The results showed significant differences for Control/cure and Movement2. For Control/cure the mean value scored by the unclassified group ( $M = 4.00$ ) and the localised inflammation or compression group ( $M = 4.15$ ) were both higher than the mean value scored by the pain syndrome group ( $M = 3.43$ ,  $F(2,61) = 4.10$ ,  $p < .05$ ). For Movement2 the mean value scored by the unclassified group

( $\underline{M} = 3.41$ ) was higher than the mean value scored by the pain syndrome group ( $\underline{M} = 2.87$ ,  $\underline{F}(2, 61) = 3.36$ ,  $p < .05$ ).

The second ANOVA tested the relationship between Diagnostic Variable 2 and each of the pain belief variables. The results showed no difference between the means of the pain beliefs variables for each diagnostic group except in the case of Control/cure. For this variable the mean value scored by the compression syndrome group ( $\underline{M} = 4.79$ ) was higher than the mean value scored by the mixed diagnosis group ( $\underline{M} = 2.89$ ,  $\underline{F}(4,28) = 4.57$ ,  $p < .05$ ).

#### The relationship between pain beliefs

Correlations between all the pain beliefs variables (see Table 12) revealed significant correlations between Movement2 and Persistence, Movement2 and Mystery, Control/cure and Persistence, Control/cure and Mystery, Control/cure and Self-blame (and Self-blame-reversed), Control/cure and Movement2, and Time and Persistence.

Table 12

Correlations between pain beliefs variables

	Persistence	Mystery	Self-blame	Self-blame-reversed	Movement2	Control/cure
Mystery	.24					
Self-blame	.08	-.03				
Self-blame-reversed	-.08	.03	-1.00			
Movement2	.25*	.59***	-.05	.05		
Control/cure	.53***	.51***	.29*	-.29*	.39**	
Time	.60***	.09	-.03	.03	.08	.12

\*  $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

## Discussion

### Findings and Implications

#### Summary of the results

The results of this study showed no relationship between beliefs and perceptions of recovery except in relation to beliefs about persistence. It indicated a strong relationship between pain and disability and no relationship between confidence in diagnosis and a perceived understanding of the condition. Finally there was support for a relationship between diagnostic type and beliefs about movement and control or cure.

#### Characteristics of the sample

Less than a third of the participants had been given a diagnosis fitting the ACC classification and less than a third of the participants had been given a diagnosis with which they agreed.

Most participants showed little change in functioning which could be due in part to the short span of time investigated. Six months is not long considering that almost 80% of participants had had the condition for a year or more. If more of the participants had had the condition for six months or less there may have been more changes in functioning as participants moved from an acute phase to a chronic phase of the condition.

Another explanation for the small improvements may be the type of treatment participants were receiving. If participants are receiving treatment that only manages their condition, it would not be surprising to see little improvement. However, little is known about the treatment that participants were receiving which could be an important consideration in future research.

It is clear that despite the little improvement the participants were still motivated to improve with at least 41 (64%) undertaking rehabilitation of some type. In addition, seven of the participants made comments on the importance of a positive attitude and eleven of the participants commented on the importance of exercise.

On average the beliefs held by this group were more positive than negative. The exceptions were beliefs about time (where there was a tendency to believe that the condition would last a long time rather than a short time) and self blame (where there was a tendency not to blame themselves). The tendency to believe that it would last a long time is not surprising as most of the group had had OOS for over a year.

#### Beliefs and Control/cure

The most strongly held beliefs were about how much they controlled their conditions. There seemed to be more of a tendency to believe in control than cure. This again may have been a reflection of how long participants had had the condition - having had it for over a year, most participants had probably found ways of managing their condition. Had this sample included more participants who had had OOS for six months or less, the scores

on the items of the Control/cure variable may have been different. There may have been a tendency towards lower scores on items about control and more optimism, and thus higher scores, on items about cure.

The fact that participants distinguished between control and cure in their comments combined with the low corrected item total correlation score for the item relating to cure on the Control/cure variable suggests that control and cure may be two separate constructs.

Another reason for the discrepancy between the beliefs about cure and the beliefs about control may have been the nature of the “cure” question - “My treatment will be effective in curing my OOS”. Participants may have believed they would find a cure for OOS in time but their current treatment was merely controlling their condition. One participant made the comment that treatments are evolving and its important to trust your own gut not the practitioner. As much treatment is aimed at managing soft tissue damage yet recent research has shown evidence of a sensorimotor disorder, participants may use a muscular therapy to control the condition while they search or wait for a cure for the sensorimotor control aspect of the disorder. However with the information collected in this study it is not possible to establish whether or not this is likely. Although it has been established that on average participants felt they understood their condition - that it was not a mystery to them - there is no information on what their understanding was.

### Beliefs about movement

Another interesting finding was the unreliable items related to beliefs about movement and avoiding pain. Whereas participants were consistent in their responses to most items about movement, these responses were not a reliable predictor of their beliefs about persisting with an activity even if it causes pain. Even though participants may not believe in continuing with an activity if it causes pain, this does not mean they think movement in itself is not of value. It is important therefore to recognise that “movement” and “movement despite pain” are two separate constructs.

It also became evident from participants’ comments that movement may have been too broad a construct and fails to take into account the different needs throughout the recovery process. The term “exercise” used throughout the Movement items could have implied a range of activities including swimming, gentle stretching, and weights. In addition, some forms of exercise may be appropriate during some stages of the recovery process but not during others.

### The relationship between beliefs and recovery

The results of this study show little evidence of a relationship between beliefs about pain and perceptions of recovery. This held true whether recovery was interpreted as improvement in function, decrease in pain or a combination of both. The only significant relationship identified was between decrease in pain and beliefs about whether or not pain would persist in their life. However as this is a retrospective study it cannot be concluded from this that the beliefs that the pain will persist causes the decrease in pain. It is as

likely, if not more likely, that the participants' experience of how much their pain has decreased in the past six months is influencing their perceptions of how much their pain will persist in the future.

#### The relationship between pain and disability

This study provided evidence for a significant and moderately strong relationship between pain and disability. This does not support the hypothesis of this study that pain will not vary with disability and is in contrast to the results found by other authors such as Waddell et al. (1993). This difference could be in part attributed to the difference between populations with back pain and populations with OOS as suggested by Lane (1997). This finding highlights the risks involved in making assumptions about people with OOS on the basis of research done with people with back pain and vice versa.

#### The relationship between accurate diagnosis and understanding of the condition

This study did not provide support for the theory that having a diagnosis they perceived to be accurate would increase the participants' belief that they understood their condition. Perhaps this is because a diagnosis may give a name to a condition or a group of symptoms, but unless health practitioners or the health literature can explain the physiological mechanisms underlying the condition then it is likely to be of limited value to the client. However, although there is disagreement amongst researchers and health practitioners on the underlying mechanisms, it appears from this study that this condition was thought to be more understood than misunderstood by participants. This confidence

held despite the fact that only 29.7% of the group had a diagnosis they perceived to be accurate.

In addition to this only 23.5% of the participants had been given a diagnosis that fitted the ACC classification system although it was clear that some participants did not understand what was meant by “specific diagnosis”. Ten (15.6%) of the participants described symptoms (e.g. pain in forearm) or causes (e.g. computer overuse) of their OOS as their specific diagnosis.

#### The relationship between diagnostic type and beliefs about pain

Diagnostic type was related to beliefs about control or cure when diagnostic type was divided into six categories: localised inflammation, compression syndrome, pain syndrome, mixed diagnosis, unclassified and no diagnosis. Participants with a compression syndrome were significantly more optimistic about controlling or curing their condition than those with a mixed diagnosis.

When diagnosis was divided into three broad categories - pain syndrome, localised inflammation/compression syndrome, and unclassified diagnosis - diagnostic type was related to beliefs about control or cure, and beliefs about movement. Participants with a pain syndrome were significantly less optimistic about control or cure than other participants. This supports the literature (e.g. Occupational Safety and Health, 1997) which suggests that treatment for pain syndromes is not as well understood as for localised inflammation and compression syndromes and some treatment may exacerbate the

condition. It is interesting therefore that the pain syndrome group did not differ significantly from other groups in their beliefs about their understanding of the condition.

Participants with a pain syndrome were significantly less optimistic about the value of exercise than participants who did not fit the classification system. Little is known about the unclassified group which limits the amount of information available as to why this difference exists. It is possible that some of those who did not have a diagnosis fitting the classification system may not have had OOS.

However, it is important to establish why the difference exists as it has major implications for treatment and may explain why some treatment has exacerbated pain syndromes. If, for instance, people with pain syndromes are experiencing a fear of movement, then it makes sense to use cognitive treatments that encourage them to overcome their fear. However, if OOS is viewed as a muscle splinting reaction as described by Wigley et al. (1992) then, although exercise may benefit people with localised conditions, encouraging people with diffuse muscle splinting to overcome their fear and perform the same sort of exercises could be detrimental. Similarly, if OOS is viewed as a sensorimotor problem, then those with more diffuse conditions are likely to have poorer general motor control than those with localised conditions and thus many forms of exercise would be difficult and again possibly detrimental. It would make more sense to improve sensorimotor control before introducing exercise programmes.

It may also be that pain syndromes have a variety of causes that vary from individual to individual; some may be limited by fear of movement, others by muscle splinting and others by a sensorimotor disorder or any combination of these three.

This also highlights the risks involved in classifying a number of different conditions under the one umbrella term, OOS. In doing this, the view is created that beliefs that are appropriate for one condition are also appropriate for another.

#### The relationship between the pain beliefs

The results of this study suggest that there was a tendency for those who felt they understood the condition to also feel that they could control or cure their condition and believe that exercise was helpful. However beliefs about how long the condition would last bore no relationship to any of the beliefs except about how much the condition would persist in their life. Thus beliefs about how much they understood their condition, how much they blamed themselves, how helpful they believed exercise to be, and how much they believed they could control or cure their condition did not seem to influence their beliefs about how long it would last. This contradicts Weinman and Petrie's (1997) theory that the belief that a condition can be controlled or cured is related to the belief that the condition will last a short time. However, there is no reason why these beliefs must be held concurrently. Some may view the belief that the condition will last a long time as negative and the belief that the condition may be cured and controlled as positive; others may view both beliefs as realistic.

The results suggest that participants who blamed themselves for their pain also felt they could control or cure their condition. This is not surprising if you consider self-blame and control/cure to reflect an underlying construct such as responsibility for self management or taking responsibility for the day-to-day management and recovery from the condition. However, given the items making up self-blame, it is not clear whether participants are blaming themselves for the fact that they are in pain today (perhaps as a result of not doing their exercise this morning) or for the fact that they were injured in the first place. Nor is it clear whether or not there is a self denigrating or shameful attitude underlying the belief. Thus self-blame could be taken to reflect one of four underlying beliefs (1) “I blame myself if I am in pain today” with a sense of shame, (2) “I blame myself for being injured in the first place” with a sense of shame, (3) “I am in control of my pain”, or (4) “I was responsible for my injury in the first place”. Before any conclusions can be made about the impact of self-blame on recovery and its relationship to other beliefs there needs to be a clearer understanding of what is meant by self-blame and whether it could more usefully be divided into four different constructs.

### Methodological Limitations

The sample size used in this study was smaller than anticipated. Of the 175 questionnaires distributed, 64 were returned. This problem was unforeseen as the initial response was very good with most of the questionnaires being returned in the first few weeks. One of the pilot group participants said that she was offered the questionnaire five times which suggests the target group had been exhausted or the distribution was not wide enough.

Most questionnaires were sent to Wellington health professionals but more could have been sent to other regions and workplaces. The Wellington City Council Move Over OOS project had similar difficulties. They surveyed people with OOS via Wellington health professionals and received approximately 14 returns from 1000 questionnaires distributed (Bukholt, personal communication, 1998). It may also have been useful to encourage health professionals to only give the questionnaire to clients who had agreed to complete it. In addition there was not a close date on the questionnaire which may also have reduced the number of returns. As there was no deadline, prospective participants may have put the questionnaire aside intending to do it later without ever getting around to it. The fact that writing is a problem for most people with OOS may also have been a deterrent so interviewing may have been a more effective way of getting information from this group.

Another limitation of this study is the reliance on memory for past pain. Researchers have found that perceptions of past pain can vary considerably. For instance, Roche and Gijsbers (1986) suggest that mood has a major influence on memory recall. If pain is recalled when the participant's mood is different from the time of the original pain then poor memory of pain should be expected. Other researchers (e.g. Bryant, 1993) found that memory for past pain levels depended on current pain levels. When current pain levels were high, past pain levels were overestimated. When current pain levels were low, past pain levels were underestimated. Contradicting these results, Jamison, Sbrocco, and Winston (1989) found that current pain ratings did not significantly influence recalled pain

rating. They found, however, that participants who generally reported high levels of constant pain were more accurate in recalling pain levels than participants who reported low levels of intermittent pain.

The difficulties of recording pain were also highlighted by the comments of 14 (21.9%) of the participants who pointed out that the intensity of their pain was variable. Conducting a longitudinal study where pain intensity is recorded at regular intervals throughout the study would also be one way of managing the variable intensity of pain and poor memory of pain.

A number of participants had difficulty completing the questionnaire. For instance, one participant indicated that the Pain Disability Index (Tait, Chibnall & Krause, 1990) was difficult to complete. Although family/home responsibilities that required grasping (e.g. vacuuming, peeling vegetables), raising arms (e.g. cleaning windows), and repetitive actions were difficult, other activities (e.g. dusting, baking cakes) were not so difficult. It may have been useful to divide activities into types of activities such as grasping, rubbing, and lifting.

Further difficulties were created by the fact that “pain” was treated as a single universal entity when in fact there are a number of different types of pain, e.g. stinging, stiffness, burning, aching, tingling. One participant pointed out that a definition of pain would be useful. Two others indicated that there are different types of pain and another pointed out

that pain is different for different people. Complicating this further is that what some participants may regard as pain, others may not. Although some may label symptoms such as burning and stiffness as pain, others may not. For example, one participant commented that pain was not a large factor in her condition yet more significant were symptoms such as lack of strength, coldness, tingling, stiffness, burning, and numbness.

### Implications for Future Research

This study suggests that beliefs alone do little, if anything, to assist perceptions of recovery. However, without controlling for treatment, it cannot be concluded that beliefs are of little value. Any relationship between beliefs and pain levels could be masked by treatment effects. For instance, some painkillers could be lowering pain levels while improving overall attitude. Similarly treatment providers, while helping to reduce pain levels, could be providing hope and reinforcing positive beliefs. Research suggests that there are a range of approaches to the treatment of musculoskeletal conditions, some of which will be more effective than others. The three main approaches treat OOS as a psychological problem, a physical or soft tissue disorder, or a sensorimotor disorder. In addition this study has highlighted differences between pain syndromes, localised conditions, and back pain that could have implications for treatment. Future research could investigate how the interactions of beliefs, differing treatment approaches, and different conditions influence recovery.

The current study demonstrated a major problem with existing beliefs questionnaires. Knish and Calder (1999) point out that, in large part, theoretical perspectives have been used to develop pain belief scales. Thus our understanding of beliefs held by people in chronic pain may be biased by theories that have already been developed. There has been little opportunity for people in chronic pain to describe their experiences without being restricted by investigators' preconceptions. This has meant there have been a number of preconceptions about what certain terms will mean and a tendency to combine constructs. It became evident from this study that "Control" needed to be defined as distinct from "Cure", "Movement" needed to be defined as distinct from "Movement without pain" as well as being broken up into different types of movement, "dangerous" needed to be defined as either "damaging" or "life threatening", "Self-blame" needed to be defined as either "taking responsibility" or "blaming oneself" and it needed to be clarified whether participants were blaming themselves for the initial injury or their current pain.

In order to develop a more in-depth understanding of the different types of pain conditions, more qualitative research is necessary. With more qualitative information, researchers will not only be able to define constructs more clearly but will gain a deeper understanding of issues such as the differences between the different types of pain conditions, participants' understanding of what causes their pain, and what are realistic beliefs for each type of condition.

There is also a need for more longitudinal research. Knish and Calder (1999) suggest that certain beliefs could be held at different phases in the process of recovery. For instance, those recently injured may hold beliefs about denial whereas those further along the process may hold beliefs related to accepting limitations. As part of a longitudinal study, more information could be obtained on the process of recovery and how beliefs influence this. For instance, if a relationship is established between beliefs and recovery, how does the relationship occur? Is it beliefs alone that cause physiological changes or do beliefs influence behaviour in ways that influence recovery?

The retrospective nature of the current study means that only relationships between beliefs and recovery have been investigated. No conclusions can be drawn about the impact of beliefs on recovery. A longitudinal study could measure beliefs at the beginning of the study and thus take a prospective look at this relationship.

The current study investigated the relationship between beliefs about pain and perceptions of recovery. All measures of recovery were subjective. However, with more objective measures becoming available, these subjective measures could be combined with objective measures to investigate not only the relationship between beliefs and recovery but also the relationship between objective and subjective measures.

## Conclusions

In order to develop effective rehabilitation strategies, the relationship between beliefs and recovery needs to be better understood. Until practitioners have a clearer understanding of the neurological and physiological mechanisms underlying the different musculoskeletal conditions, it seems simplistic to advocate particular beliefs and assume these beliefs will assist recovery. Unrealistic optimism could be obstructive to rehabilitation. For instance, if a client believes they will recover in a short time when in fact recovery is not possible in the short term, they may be reluctant to undertake vocational rehabilitation believing that in the short term they will return to their pre-injury occupation. A client with a sensorimotor disorder may observe that exercise is helpful for other people with OOS or back pain and undertake an exercise programme that makes their condition worse. A client with soft tissue damage may be encouraged to believe they need to overcome an irrational fear of pain and thus damage tissues further. Whereas self-blame may lead to effective coping in a condition that is easily controllable, it may lead to a feeling of low self worth in conditions that are not. Overly optimistic beliefs may encourage clients to set unrealistic goals for their physical rehabilitation, resulting in a sense of failure when these goals are not met. If clients are continually encouraged to undertake treatment that is counterproductive, they may become sceptical about all treatment, even that which could potentially be helpful.

This study suggests that the relationship between beliefs and recovery is more complex than previously suggested. To understand this relationship more fully, more research is

needed into the underlying mechanisms of the different pain conditions and the efficacy of the treatments available. Recognition needs to be given to the fact that treatment that is appropriate for one condition, may not be appropriate for another.

This study also highlighted some of the limitations of existing beliefs questionnaires and a need for more rigorous definitions of many of the constructs used. It also highlighted the need for more qualitative research to enable better definition of terms and to gain more information on the different types of conditions and the recovery process.

## References

- ACC Statistics Section. (October 1995). OOS claims in New Zealand by Occupation, *Advisors' Manual for Occupational Overuse Syndrome Prevention Programme*, ACC, Wellington.
- Altmaier, E. M., Lehmann, T. R., Russell, D. W., Weinstein, J. N., & Kao, C. F. (1992). The effectiveness of psychological interventions for the rehabilitation of low back pain: a randomized controlled trial evaluation. *Pain*, 49, 329-335.
- Altmaier, E. M., Russell, D. W., Kao, C. F., Lehmann, T. R., & Weinstein, J. N. (1993). Role of self efficacy in rehabilitation outcome among chronic back pain patients. *Journal of Counselling Psychology*, 40, 335-339.
- Bammer, G., & Blignault, I. (1988). More than a pain in the arms: a review of the consequences of developing occupational overuse syndromes (OOSs). *Journal of Occupational Health and Safety, Australia and New Zealand*, 4 (5), 389-397.
- Bammer, G., & Martin, B. (1988). The arguments about RSI: an examination. *Community Health Studies*, 12(3), 348-358.

- Browne, C. D., Nolan, B. M., & Faithfull, D. K. (1984). Occupational repetition strain injuries. Guidelines for diagnosis and management. *The Medical Journal of Australia*, 140, 329-332.
- Bryant, R. A. (1993). Memory for pain and affect in chronic pain patients. *Pain*, 54, 347-351.
- Buckelew, S. P., Murray, S. E., Hewett, J. E., Johnson, J., & Huyser, B. (1995). Self-efficacy, pain and physical activity among fibromyalgia subjects. *Arthritis Care and Research*, 8(1), 43-50.
- Buckelew, S. P., Parker, J. C., Keefe, F. J., Deuser, W. E., Crews, T. M., Conway, R., Kay, D. R., & Hewett, J. E. (1994) Self-efficacy and pain behaviour among subjects with fibromyalgia. *Pain*, 377-384.
- Bulman, R. J., & Wortman, C. B. (1997). Attributions of blame and coping in the "Real World": severe accident victims react to their lot. *Journal of Personality and Social Psychology*, 35(5), 351-363.
- Byl, N. N., & Melnick, M. (1997). The neural consequences of repetition: clinical implications of a learning hypothesis. *Journal of Hand Therapy*, 10, 160-174.

- Byl, N. N., Merzenich, M. M., Cheung, S., Bedenbaugh P., & Jenkins, W. M. (1997). A primate model for studying focal dystonia and repetitive strain injury: effects on the primary somatosensory cortex. *Physical Therapy*, 77, 269-284.
- Cousins, M. C. (1989). Acute and post operative pain. In P. D. Wall & R. Melzack (Eds). *Textbook of Pain*. Churchill Livingstone, London.
- Craig, K. D. (1989). Emotional aspects of pain. In P. D. Wall & R. Melzack (Eds). *Textbook of Pain*. Churchill Livingstone, London.
- Dorland, S., & Hattie, J. (1992). Coping and repetitive strain injury, *Australian Journal of Psychology*, 44(1), 45-49.
- Elton, N. H., Hanna, M., M. H., & Treasure, J. (1994). Coping with chronic pain: some patients suffer more. *British Journal of Psychiatry*, 165, 802-807.
- Feuerstein, M., Callan-Harris, S., Hickey, P., Dyer, D., Armbruster, W. & Carosella, A. (1993). Multidisciplinary rehabilitation of chronic work-related upper extremity disorders. *Journal of Occupational Medicine*, 35, 396-403.
- Gamsa, A. (1990). Is emotional disturbance a precipitator or a consequence of chronic pain? *Pain*, 42, 183-195.

Gamsa, A. (1994). The role of psychological factors in chronic pain. I. A half century of study. *Pain*, 57, 5-15.

Gaston-Johansson, F., Gustafsson, M., Felldin, R., & Sanne, H. (1990). A comparative study of feelings, attitudes and behaviours of patients with fibromyalgia and rheumatoid arthritis. *Social Science and Medicine*, 31(8), 941-947.

Greening, J., & Lynn, B. (1998). Vibration sense in the upper limb in patients with repetitive strain injury and a group of at-risk office workers. *International Archives of Occupational and Environmental Health*, 71, 29-34.

Greening, J., Smart, S., Leary, R., Hall-Craggs, M., O'Higgins, P., & Lynn, B. (1999). Reduced movement of median nerve in carpal tunnel during wrist flexion in patients with non-specific arm pain. *The Lancet*, 354, 217-218.

Hanna, T. (1988) *Somatics: reawakening the mind's control of movement, flexibility and health*. Addison-Wesley Publishing Company, Inc, USA.

Helliwell, P. S., Mumford, D. B., Smeathers, J. E., & Wright, V. (1992). Work related upper limb disorder: the relationship between pain, cumulative load, disability and psychological factors. *Annals of the Rheumatic Diseases*, 51, 1325-1329.

- Jamison, R. N., Sbrocco, T., & Parris, W. C. V. (1989). The influence of physical and psychosocial factors on accuracy of memory for pain in chronic pain patients. *Pain*, 37, 289-294.
- Jensen, M. P., Turner, J. A., & Romano, J. M., (1991). Self-efficacy and outcome expectancies: relationship to chronic pain coping strategies and adjustment. *Pain*, 44, 263-269.
- Jensen, M. P., Turner, J. A., Romano, J. M., & Karoly, P. (1991). Coping with chronic pain: a critical review of the literature. *Pain*, 47, 249-283.
- Knish, S., & Calder, P. (1999). Beliefs of chronic low back pain sufferers: a concept map. *Canadian Journal of Rehabilitation*, 12(3), 167-179.
- Lane, M. (1997). *The relationship between pain and disability*, Master's Thesis, Massey University, New Zealand.
- Lucire, Y. (1988). Social iatrogenesis of the Australian disease "RSI". *Community Health Studies*, 12(2), 146-150.

Merskey, H. (1979) Pain terms: a list with definitions and notes on usage. Recommended by the IASP subcommittee on Taxonomy. *Pain*, 6, 249-252.

Occupational Safety and Health Service, Department of Labour and Accident Rehabilitation and Compensation Insurance Corporation (1997). *Occupational Overuse Syndrome Treatment and Rehabilitation: A Practitioners Guide*. Wellington

Owen, E. R. (1985). The search for the pathology of repetition strain injuries. *The Journal of Occupational Health and Safety – Australia and New Zealand*, 1(3), 237-241.

Partridge, C., & Johnston M. (1989). Perceived control of recovery from physical disability: measurement and prediction. *British Journal of Clinical Psychology*, 28, 53-59.

Rachman, S., & Lopatka, K. (1988). Accurate and inaccurate predictions of pain. *Behaviour Research and Therapy*, 26(4), 291-296.

Ranney, D. (1993). Work-related chronic injuries of the forearm and hand: their specific diagnosis and management. *Ergonomics*, 36(8), 871-880.

- Roche, P. A., & Gijssbers, K. (1986). A comparison of memory for induced ischaemic pain and chronic rheumatoid pain. *Pain*, 25, 337-343.
- Rowat, K. M., & Jeans, M. E. (1989). A collaborative model of care: patient, family and health professionals. In P. D. Wall & R. Melzack (Eds) *Textbook of Pain*. Churchill Livingstone, London.
- Ruth, S. & Kegerreis, S. (1992). Facilitating cervical flexion using a Feldenkrais method: Awareness Through Movement. *Journal of Orthopaedic and Sports Physical Therapy*, 16(1), 25-29.
- Schwarzer, R. (1995). *The Role of Optimistic Self Beliefs in the Adoption and Maintenance of Health Behaviours*, Occasional Papers in Psychology, Massey University, New Zealand.
- Shadbolt, B. (1988). The severity of life strains and stresses reported by female RSI sufferers. *Journal of Occupational Health and Safety*, 4(3), 239-249.
- Sharma, S. D., Smith, E. M., Hazleman, B. L., & Jenner, J. R. (1997). Thermographic changes in keyboard operators with chronic forearm pain. *British Medical Journal*, 314, 118.

- Slappendel, C. (1996) What do we mean by "OOS"? *Safeguard*, 40, 20-21.
- Spence, S. H. (1991) Case history and shorter communication cognitive-behaviour therapy in the treatment of chronic, occupational pain of the upper limbs: a 2 yr follow-up. *Behaviour Research and Therapy*, 29 (5) 503-509.
- Spillane, R. M., & Deves, L. A. (1988). Psychosocial correlates of RSI reporting. *Journal of Occupational Health and Safety, Australia and New Zealand*, 4(1), 21-27.
- Stephens, Christine V. (1993). *Occupational Overuse Syndrome and Psychosocial Stressors in the Work Place*, Master's Thesis, Massey University, New Zealand.
- Strong, J., Ashton, R., Cramond, T., & Chant, D. (1990). Pain intensity, attitude and function in back pain patients. *Australian Occupational Therapy Journal*, 37, 179-183.
- Swerissen, H., Matyas, T., & Thomas S. (1991). An experimental investigation of a cognitive-behavioural and movement-retraining program for the treatment of chronic pain associated with occupational overuse injuries. *Behaviour Change*, 8(2), 60-69.

- Tait, R. C., Chibnall, J. T., & Krause, S. (1990) The Pain Disability Index: psychometric properties. *Pain*, 40, 171-182.
- Turk, D. C., Meichenbaum D., & Genest M. (1983). *Pain and Behavioural Medicine. A Cognitive-behavioural Perspective*. New York: Guildford Press.
- Turner, J. A., Whitney C., Dworkin, S. F., Massoth, D., & Wilson, L., (1995) Do changes in patient beliefs and coping strategies predict temporomandibular disorder treatment outcomes? *The Clinical Journal of Pain*, 11, 177-188.
- Vlaeyen, J. W. S., Kole-Snijders, A. M. J., Boeren, R. G. B., & van Eek, H. (1995). Fear of movement/(re)injury in chronic low back pain and its relation to behavioural performance. *Pain*, 62, 363-372.
- Waddell, G., Newton, M., Henderson, I., Somerville, D., & Main C. J. (1993). A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain*, 52, 157-168.
- Weinman J., Petrie K. J., Moss-Morris, R., & Horne, R. (1996). The Illness Perception Questionnaire: a new method for assessing the cognitive representation of illness. *Psychology & Health*, 11, 431-445.

- Weinman, J., & Petrie, K. J. (1997). Illness perceptions: a new paradigm for psychosomatics? *Journal of Psychosomatic Research*, 42(2), 113-116.
- Wigley, R. D., Turner, W. E. D., Blake, B. L., Darby, F. W., McInnes, R., & Harding, P. (1992). *Occupational Overuse Syndrome Treatment and Rehabilitation: A Practitioners Guide*. Wellington: Occupational Safety and Health Service, Department of Labour.
- Wigley, R. D. (1990). Repetitive strain syndrome – fact not fiction. *New Zealand Medical Journal*, 103, 75-76.
- Williams, D. A., & Keefe, F. J. (1991). Pain beliefs and the use of cognitive-behavioural coping strategies. *Pain*, 46, 185-190.
- Williams, D. A., & Thorn, B. E. (1989). An empirical assessment of pain beliefs. *Pain*, 36, 351-358.

## APPENDICES

## Appendix A: Information sheet



**MASSEY  
UNIVERSITY**

Private Bag 11222  
Palmerston North  
New Zealand  
Telephone +64-6-356 9099  
Facsimile +64-6-350 5673

**COLLEGE OF HUMANITIES  
AND SOCIAL SCIENCES**

—  
SCHOOL OF  
PSYCHOLOGY

## **Information about my research on OOS**

### **About me**

My name is Cindy Allison and I am doing research for a masterate thesis in psychology. My supervisor is Dr. Christine Stephens of Massey University. I have suffered from Occupational Overuse Syndrome (OOS) for some years so felt this was a good topic on which to do my thesis.

### **Research objective**

The aim of my research is to understand any relationships between beliefs about OOS and recovery. As previous research findings have been inconclusive, I am making no predictions about what these relationships might be. Most of the questions I have used are from previously developed questionnaires

### **What I need**

To carry out this research I need 50 to 100 volunteers who are willing to fill out questionnaires about their OOS.

### **Eligibility**

You are eligible to take part in this study if you have been diagnosed as having OOS for at least six months.

### **What I want from you**

If you are interested in taking part please fill out the attached questions. They should take about 20 minutes to complete. There is space for your own comments following each section.

This questionnaire is voluntary; you are not obliged to complete it. If you do decide to take part in the study and there are any questions you do not want to answer you are welcome to leave them blank.

Please return the completed questionnaire in the Freepost envelope provided. You do not need to add postage.

## **Confidentiality and anonymity**

You do not need to write your name on the questionnaire, so all your answers can be anonymous if you wish. The only people that will have access to your answers will be myself and my supervisor. At the end of the research your answers will be destroyed and the results will be written in such a way that it will not be possible to identify you.

## **Informed consent**

It is assumed that, by filling out the questionnaire, you consent to take part in the research.

## **Summary of findings**

If you wish to have a summary of the findings at the completion of this study please indicate this when you complete the questionnaire or contact me (contact details below).

## **Further information**

If you have any questions or concerns about this project, please contact me or Christine Stephens.

Our contact details are:

Cindy Allison  
PO Box 24054  
WELLINGTON

Telephone: (04) 475 6255

Dr. Christine Stephens  
Department of Psychology  
Massey University  
Private Bag 11222  
Palmerston North

Telephone: (06) 350 4146

Your help with this project would be greatly appreciated.



Cindy Allison

Appendix B: Questionnaire used in this study

Please answer the questions below as best you can. Where you are given a choice of answers (indicated by the  ) please tick one box only.

1. Where did you get this questionnaire?

Doctor     Physiotherapist     Support Group     Chiropractor   
Occupational Therapist     Other  (please specify) \_\_\_\_\_

2. When were you first diagnosed as having OOS?

1 to 6 months ago     6 to 12 months ago     12 months to 2 years ago   
2 to 6 years ago     6 to 10 years ago     more than 10 years ago

3. There are a variety of specific diagnoses that come under the umbrella term OOS. Have you been given a specific diagnosis or diagnoses?

Yes     No

If you answered 'Yes' then please state below any specific diagnoses you have been given and whether or not you thought they were accurate. If you have been given more than one specific diagnosis, please put them in chronological order with the earliest diagnosis first.

Diagnosis: _____	Accurate: Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
Diagnosis: _____	Accurate: Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
Diagnosis: _____	Accurate: Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
Diagnosis: _____	Accurate: Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
Diagnosis: _____	Accurate: Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
Diagnosis: _____	Accurate: Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>

4. Before you developed OOS how often did you experience pain such as head aches or back aches?    Never     Hardly ever     Sometimes     Frequently     All the time

Comments:

13. Standing
- \_\_\_\_\_ 0 1 2 3 4 5 6 7 8 9 10 \_\_\_\_\_  
no disability total disability
14. Sleeping
- \_\_\_\_\_ 0 1 2 3 4 5 6 7 8 9 10 \_\_\_\_\_  
no disability total disability
15. Typing
- \_\_\_\_\_ 0 1 2 3 4 5 6 7 8 9 10 \_\_\_\_\_  
no disability total disability
16. Pain intensity. For this item please circle the number on the scale which describes the level of pain you typically experience.
- \_\_\_\_\_ 0 1 2 3 4 5 6 7 8 9 10 \_\_\_\_\_  
no pain extreme pain

Comments:

Now we would like you to consider your past level of disability. For each of the categories listed, below circle the number on the scale which describes the level of disability you typically experienced 6 months ago.

17. Family/home responsibilities (e.g. cooking, washing)
- \_\_\_\_\_ 0 1 2 3 4 5 6 7 8 9 10 \_\_\_\_\_  
no disability total disability
18. Recreation (e.g. hobbies, sports)
- \_\_\_\_\_ 0 1 2 3 4 5 6 7 8 9 10 \_\_\_\_\_  
no disability total disability
19. Social activity (e.g. parties, movies, dining out)
- \_\_\_\_\_ 0 1 2 3 4 5 6 7 8 9 10 \_\_\_\_\_  
no disability total disability
20. Occupation (i.e. activities that are a part of or directly related to your job.)
- \_\_\_\_\_ 0 1 2 3 4 5 6 7 8 9 10 \_\_\_\_\_  
no disability total disability

21. Personal care (e.g. washing, dressing)

0 1 2 3 4 5 6 7 8 9 10  
no disability total disability

22. Lifting

0 1 2 3 4 5 6 7 8 9 10  
no disability total disability

23. Walking

0 1 2 3 4 5 6 7 8 9 10  
no disability total disability

24. Sitting

0 1 2 3 4 5 6 7 8 9 10  
no disability total disability

25. Standing

0 1 2 3 4 5 6 7 8 9 10  
no disability total disability

26. Sleeping

0 1 2 3 4 5 6 7 8 9 10  
no disability total disability

27. Typing

0 1 2 3 4 5 6 7 8 9 10  
no disability total disability

28. Pain intensity. For this item please circle the number on the scale which describes the level of pain you typically experienced 6 months ago.

0 1 2 3 4 5 6 7 8 9 10  
no pain extreme pain

Comments:

Now we would like you to consider a series of statements that people have made about their condition. Please state your level of agreement with each statement on the following five point scale.

strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
1	2	3	4	5

- \_\_\_ 29. No one's been able to tell me exactly why I'm in pain.
- \_\_\_ 30. I used to think my pain was curable but now I'm not so sure.
- \_\_\_ 31. There are times when I am pain-free.
- \_\_\_ 32. My pain is confusing to me.
- \_\_\_ 33. My pain is here to stay.
- \_\_\_ 34. I am continuously in pain.
- \_\_\_ 35. If I am in pain it is my own fault.
- \_\_\_ 36. I don't know enough about my pain.
- \_\_\_ 37. My pain is a temporary problem in my life.
- \_\_\_ 38. It seems like I wake up with pain and I go to sleep with pain.
- \_\_\_ 39. I am the cause of my pain.
- \_\_\_ 40. There is a cure for my pain.
- \_\_\_ 41. I blame myself if I am in pain.
- \_\_\_ 42. I can't figure out why I'm in pain.
- \_\_\_ 43. Someday I'll be 100% pain free again.
- \_\_\_ 44. My pain varies in intensity but is always with me.
- \_\_\_ 45. I'm afraid that I might injure myself if I exercise.
- \_\_\_ 46. If I were to try to overcome it, my pain would increase.
- \_\_\_ 47. My body is telling me I have something dangerously wrong.
- \_\_\_ 48. My pain is probably relieved by exercise.
- \_\_\_ 49. People aren't taking my medical condition seriously enough.
- \_\_\_ 50. My accident has put my body at risk for the rest of my life.

- 51. Pain always means I have injured my body.
- 52. Just because something aggravates my pain does not mean it is dangerous.
- 53. I am afraid that I might injure myself accidentally.
- 54. Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening.
- 55. I wouldn't have this much pain if there weren't something potentially dangerous going on in my body.
- 56. Although my condition is painful, I am better off when I am physically active.
- 57. Pain lets me know when to stop exercising so that I don't injure myself.
- 58. It's really not safe for a person with a condition like mine to be physically active.
- 59. I can't do all the things other people do because it's too easy for me to get injured.
- 60. Even though something is causing me a lot of pain, I don't think it's actually dangerous.
- 61. No one should have to exercise when he/she is in pain.
- 62. My OOS will improve in time
- 63. There is a lot which I can do to control my symptoms
- 64. There is very little that can be done to improve my OOS
- 65. My treatment will be effective in curing my OOS
- 66. Recovery from my OOS is largely dependent on chance or fate
- 67. What I do can determine whether my OOS gets better or worse
- 68. My OOS will last a short time
- 69. My OOS is likely to be permanent rather than temporary
- 70. My OOS will last for a long time

Comments:

Thank you for your time.