CANADIAN THESES

THÈSES CANADIENNES

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30.

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30.

THIS DISSERTATION HAS BEEN MICROFILMED EXACTLY AS RECEIVED

LA THÈSE A ÉTÉ MICROFILMÉE TELLE QUE NOUS L'AVONS REÇUE

THE EFFECTS OF STRESS MANAGEMENT TRAINING ON THE SYMPTOMS OF FIBROSITIS

by

Lynda Gifford

B.A., Northeastern Bible College,

New Jersey, U.S.A., 1974

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS (EDUCATION)

in the Faculty of

Education

SIMON FRASER UNIVERSITY

July, 1986

ISBN 0-315-36268-5

APPROVAL

Name: Lynda Gifford

Degree: Master of Arts (Education)

Title of Thesis: The Effects of Stress Management Training on the Symptoms of Fibrositis

Examining Committee

Chairperson:

B. A. Hiebert
Senior Supervisor

R. W. Marx
Professor

K. Craig
Dept. of Psychology, UBC

A. Chalmers
Director of Research at
B. C. Arthritis Centre

J. Schmidt
Psychology Dept.
Vancouver General Hospital
External Examiner

Date approved July 28, 1986

PARTIAL COPYRIGHT LICENSE

I hereby grant to Simon Fraser University the right to lend my thesis, project or extended essay (the title of which is shown below) to users of the Simon Fraser University Library, and to make partial or single copies only for such users or in response to a request from the library of any other university, or other educational institution, on its own behalf or for one of its users. I further agree that permission for multiple copying of this work for scholarly purposes may be granted by me or the Dean of Graduate Studies. It is understood that copying or publication of this work for financial gain shall not be allowed without my written permission.

Title of Thesis/Project/Extended Essay

THE EFFECTS OF STRESS MANAGEMENT TRAINING ON THE SYMPTOMS OF FIBROSITIS

Author:

(Signature)

Lynda Gifford

(name)

Aug 5/86

(date)

ABSTRACT

Even though fibrositis has long been considered to be one of the most common forms of the rheumatic disorders, little is known about its etiology or treatment. Various studies have postulated that excessive stress exacerbates the symptoms of fibrositis and that stress management techniques may therefore be effective in treatment. So far few studies have been conducted that test this hypothesis. This study attempted to address such an issue by investigating the effects of stress management training on the following symptoms of fibrositis: tender point sensitivity, the subjective experience of pain, and sleep integrity. The subjects' levels of anxiety and depression were also monitored.

Three subjects participated in the research project that utilized a single-subject multiple baseline across subjects design. Three types of data were collected: paper and pencil measures, including the State-Trait Anxiety Inventory, the Arthritis Impact Measurement Scales, the Beck Depression Inventory, the McGill Pain Questionnaire, and dolorimeter readings. These data were collected at study entry, pretreatment, posttreatment, and at study end. Subjects also monitored throughout the study their daily pain ratings, nightly sleep patterns, medication intake, and physiological responses to the relaxation practice sessions. Treatment consisted of six

weeks of training in stressor and stress response identification and in relaxation techniques.

Participants in the study reported an increased ability to relax during the course of the treatment. This was evident in their self-monitored physiological responses to the relaxation practice sessions. However, no overall decrease in the target symptoms of any of the subjects was demonstrated by the dependent measures. Each subject expressed difficulty with the assignments in the training program that focussed on learning to become aware of physiological indicators of stress and pacing of daily activities. Implications and future research directions are presented.

ACKNOWLEDGEMENTS

I would like to thank Ken Craig and Andrew Chalmers, members of my committee, for their support during the development of this thesis. However I would like to extend my special thanks to Bryan Hiebert, my thesis supervisor, for his feedback and steady encouragement. I would also like to extend my thanks to Joan Berlow, social worker at the Arthritis Society, B.C. division, whose time and energy contributed to the completion of this project. Finally, I would like to thank Barry Koehler, Medical Director of the Arthritis Society, B.C. Division, for his assisitance in obtaining the dolorimeter readings.

TABLE OF CONTENTS

Page

Approval page....ii

Abstract....iii

Acknowledgements....v

Table of Contents....vi

List of Tables....ix

List of Figures....x

CHAPTER 1....1

The Problem....10
Overview....11

CHAPTER 2. REVIEW OF THE RELATED LITERATURE....12

Fibrositis....13
Diagnosis....13
Clinical picture....13
Primary vs. secondary fibrositis....13
Diagnostic criteria....14
Generalized pain....16
Tender points....17
Laboratory studies....19
Disturbed sleep patterns and faigue....19
Psychological variables....21
Additional symptoms....24
Modulators....25
Fibrositis vs. Psychogenic Rheumatism....26
Prognosis....29
Etiology....30
Treatment and Management....33
Medical....33
Pharmacological....34
Psychological....35
Pain....36
Theories....37
Contributing variables....39
Relaxation and Chronic Pain Management....46
Relaxation Techniques....50
Progressive muscle relaxation....50
Cue-controlled relaxation....52
Differential relaxation....53
Physiological measures of relaxation....53
Summary....54
Hypotheses....55

CHAPTER 3. DESIGN AND METHODOLOGY.....56

Single-Subject Design.....56
Historical Basis.....56
Advantages.....58
Limitations.....61
Methodology.....63
Generalizability.....64
Summary.....66
Sample.....66
Sample Selection.....66
Subject Profile.....67
Research Design.....70
Dependent Measures.....71
State-Trait Anxiety Inventory.....71
Arthritis Impact Measurement Scales.....73
McGill Pain Questionnaire.....75
Beck Depression Inventory.....77
Dolorimeter.....81
Self-Monitoring Charts.....82
Facilities.....83
Staff.....84
Treatment Procedures.....84
Pre Treatment.....84
Treatment.....85
Session one.....85
Session two.....87
Session three.....88
Session four.....89
Session five.....91
Session six.....92

CHAPTER FOUR. DATA ANALYSIS AND CONCLUSIONS.....95

Missing Data.....95
Hypotheses.....96
Hypothesis #1.....96
Results.....96
Conclusions.....96
Hypothesis #2.....100
Results.....100
Conclusions.....106
Hypothesis #3.....107
Results.....107
Conclusions.....114
Hypothesis #4.....114
Results.....114
Conclusions.....119
Subjective Reports.....119
Effect of Treatment.....119
Monitoring of Physical Symptoms.....120
Validation of Phenomena.....121
Pacing.....122
Conclusions.....123

CHAPTER FIVE. IMPLICATIONS AND FUTURE DIRECTIONS.....124

Summary of Results.....124
Support For Treatment.....124
Results.....126
Limitations.....128
Definition of Treatment Success.....128
Symptom Undulation.....130
Multi-Component Treatment Approach.....131
Length of Treatment.....132
Nonmedical Treatment Approach.....134
Small Number of Subjects.....136
Self-Report Discrepancies.....136
Lack of Family Involvement.....138
Dolorimeter Readings.....138
Strengths.....139
Single-Case Design.....139
Adherence to Treatment Protocol.....140
Self Report Measures.....140
Future Treatment and Research Directions.....140
Recommendations.....143

APPENDIX A. Letter to Rheumatologists.....150
APPENDIX B. Fibrositis Information Sheet.....153
APPENDIX C. Study Information Sheet.....156
APPENDIX D. Consent Form.....158
APPENDIX E. Demographic Data Questionnaire.....160
APPENDIX F. Treatment Protocol.....167
APPENDIX G. Relaxation Script - Long 233
APPENDIX H. Stress Log.....245
APPENDIX I. Relaxation Script - Short.....246
APPENDIX J. Differential Relaxation Instructions.....252
References.....253

LIST OF TABLES

Page

Table 1. Demographic Data.....68

Table 2. History of Symptoms.....68

Table 3. Symptom Intensity.....69

Table 4. Affective Variables.....70

Table 5. Dolorimeter Readings of 16 Tender Points - Subject 01.....97

Table 6. Dolorimeter Readings of 16 Tender Points - Subject 02.....98

Table 7. Dolorimeter Readings of 16 Tender Points - Subject 03.....99

Table 8. M.P.Q. Scores - Subject 01.....101

Table 9. M.P.Q. Scores - Subject 02.....102

Table 10. M.P.Q. Scores - Subject 03.....102

Table 11. AIMS Normalized Scores For All Three Subjects.....104

Table 12. Beck Depression Inventory Scores For All Three Subjects.....108

Table 13. AIMS Depression Scale Scores For All Three Subjects.....108

Table 14. STAI-T, STAI-S, and AIMS Anxiety Scale Scores For All Three Subjects.....109

Table 15. Tension State Mean Scores For All Three Subjects.....111

Table 16. Heart Rate Mean Scores For All Three Subjects.....112

Table 17. Respiration Rate Mean Scores For All Three Subjects.....113

LIST OF FIGURES

Page

Figure 1. Weekly Pain Means.....105

Figure 2. Weekly Continuous Sleep Means.....115

Figure 3. Weekly Interrupted Sleep Means.....116

Figure 4. Weekly Number of Interruptions Means.....117

CHAPTER 1

Fibrositis has long been considered to be one of the most common forms of the rheumatic disorders (Graham, 1953; Klinefelter, 1972). Even though fibrositis has been recognized as a distinct clinical syndrome since 1904 (Gowers, 1904) it remains a medical challenge. Its diagnostic criteria are still debated (Reynolds, 1982; Yunus, Masi, Calabro, Miller, & Feigenbaum, 1981), its etiology and pathogenesis remains unknown (Simons, 1976), and the recommended treatments are numerous, inconsistent, and demonstrate various degrees of efficacy (Simons, 1976).

The fibrositis syndrome is characterized by chronic, generalized aches and pains, exhaustion, and increased tenderness at specific body sites (Smythe, 1979; Yunus et al., 1981). The symptoms are usually exacerbated by several modulators including cold, humidity, too much or too little activity, anxiety, and fatigue (Simons, 1976; Smythe, 1979; Yunus et al., 1981). The patients' well preserved musculature is in noticable contrast to their continual complaints of pain and disability (Smythe, 1981). The syndrome is considered primary when there is no known cause or contributory disorder (Yunus et al., 1981). It is considered

secondary when there is an identifiable associated trauma or disease state (Smythe, 1981).

There is still debate over what constitutes the specific diagnostic criteria for fibrositis. In 1977 Smythe (Smythe & Moldofsky, 1977) attempted to establish firmer diagnostic criteria for fibrositis. These were further refined by Smythe (1979) and by Yunus and his collegues (Yunus et al., 1981). They divided the diagnostic criteria into three major categories: obligatory criteria, major criterion, and minor criteria. There were two obligatory criteria. The first was the presence of generalized aches and pains or prominent stiffness involving three or more anatomical sites for at least three months. The second was the absence of secondary causes (traumatic, rheumatic, infective, endocrine, or malignant), and normal laboratory tests and roentgenograms. The major criterion was the presence of at least five typical and consistent tender points. The minor criteria consisted of ten types of symptoms: modulation of symptoms by weather factors; aggravation of symptoms by anxiety and stress; poor sleep; general fatigue or tiredness; anxiety; chronic headache; irritable bowel syndrome; subjective swelling; and numbness. For a diagnosis of primary fibrositis all patients must satisfy the two obligatory criteria, as well as the major criterion, plus at least three minor

criteria. If the patient has only three or four tender points, then the authors suggest that five minor criteria need to be met.

Fibrositis is a benign condition which may have exacerbations and remissions (Yunus et al., 1981). Excellent general health can be expected and muscle bulk and passive movement of the joints remain normal (Smythe, 1979). The problem with fibrositis arises when pain and exhaustion lead to failing performance and the patient becomes less active (Smythe, 1979). Anxiety and depression can result which may lead to a further decrease in activity and an increase in symptoms. A vicious circle is then established.

As in any physical disturbance psychological variables probably contribute to the experience of the fibrositis syndrome. Unfortunately there is little, if any, empirical evidence at this time to indicate what these variables may be and to what extent they act as symptom modulators. There is however enough data to justify formulating a hypothesis that certain psychological variables exacerbate the symptoms of fibrositis. Yunus et al. (1981) found that the fibrositis patients differed significantly from the control group in reported anxiety. Seventy percent of the subjects reported being unduly anxious and in 68% symptoms were reported to be made worse by anxiety and

mental states (mental states was undefined). Anxiety correlated with sleep problems, headaches, irritable bowel syndrome, low back pain, and tender points at the posterior-iliac crest and the lumbar spine. The drawback with this study is that the authors do not indicate whether the patients' anxiety was determined purely by anecdotal report or by recognized psychometric instruments. The same problem is found in other studies that mention anxiety and emotional stress as symptom exacerbators (Campbell, Clark, Tindell, Forhand, & Bennett, 1983).

There are other variables that have the potential of affecting the mood states of fibrositis patients, and therefore possibly their symptoms. One of these is that fibrositis patients have no observable signs that validate their expressed discomfort. They complain of pain and fatigue while appearing physically healthy. Observers may therefore think the patients are exaggerating, faking it, or just not pushing themselves hard enough. The patients may begin to have the same doubts themselves. Another important variable that must be considered is that fibrositis patients have often been previously misdiagnosed and therefore subjected to ineffective treatments (Campbell et al., 1983; Yunus et al., 1981). Both of the above factors will affect the patients' perceptions of themselves and their illness,

which in turn will affect their illness behaviour. This process can lead to a number of emotional reactions including anxiety, depression, anger or frustration, and a concomitant increase in symptoms (Campbell et al., 1983).

The modulating effect of mood states in fibrositis is recognised and relaxation techniques such as relaxation training, vacations, changes of life style and increases in recreational releases are recommended as part of treatment (Simons, 1976; Smythe, 1981; Yunus et al., 1981). However, there is little that describes how these changes are to be accomplished, and if these techniques actually do reduce the patients' symptoms. It is hoped that this project will shed more empirical light on one aspect of treatment, namely the clinical benefit of coping strategies that focus on stress management.

The major symptom of fibrositis is chronic pain. Prior to 1965 there were two basic theories of pain, the 'specificity theory' and the 'pattern theory' (Melzack & Wall, 1982). In 1965 Melzack and Wall proposed the gate control theory of pain that has become the basis of modern pain theory (Lipton, 1979). It appears to offer the best explanation so far as to why pain can behave so incosistently. Briefly, this theory suggests that there are a number of mechanisms operating in pain perception. It postulates that at the spinal

cord level there is a 'gate' that under certain circumstances allows pain stimulation to pass through to higher centres and at other times suppresses it. The gate is not only under local control from peripheral nerve fibres, but is also modulated through a central descending control mechanism. Therefore cortical activity can affect the gate and this can happen very rapidly (Lipton, 1979; Melzack & Wall, 1982).

The gate control theory of pain explains why numerous psychological variables exert an influence on pain and its perception. It is now well accepted that the pain experienced is not simply a function of the amount of physical damage, but is determined by our previous experience (conditioning), our ability to understand its causes and consequences, our culture, socio-economic status and life circumstances, our moods, including anxiety and depression, and our assessment of our ability to deal with the pain (Bond, 1980; Craig, 1983; Melzack & Wall, 1982; Merskey, 1974).

Anxiety is frequently one of the accompanying mood states of patients who suffer from chronic pain (Sternbach, 1974). The anxiety can be the result of numerous factors including anticipation of further pain or life disruption (Craig, in press), fear of being considered neurotic, fear of being denied further medical help (Bond, 1980), fear of losing control over the pain

and one's physical well-being (Melzack & Wall, 1982), and the stress that chronic pain creates in interpersonal relationships and work situations. All of these factors are pertinent to the experience of the fibrositis patient and makes them prime candidates for potentially high levels of anxiety.

The literature demonstrates that chronically anxious people appear particularly vunerable to the occurrence and amplification of pain (Craig, in press; Merskey, 1974). During stressful times the body establishes the 'fight-or-flight' response, which leads to an increase in muscle tension, blood pressure, heart rate and adrenalin flow (Selye, 1978). Melzack and Wall (1982) state that all of this activity feeds into the nervous system producing feelings of tension and irritability, and may either produce pain directly (such as tension headaches) or indirectly by facilitating activity in the neuron pools that project pain signals to the brain. It has also been found that raised levels of anxiety can be the result of illness and pain (Sternbach & Timmerman, 1975). Thus a vicious circle of anxiety increasing pain and pain increasing anxiety can be established.

Relaxation training is now frequently used as an intervention with chronic pain. Benson (1976) has proposed that as the body has an innate 'fight-or-

flight' response it also has an innate 'relaxation response'. He and his colleagues believe that this response is the basis of all meditative practices. They suggest that relaxation reduces the activity of the sympathetic nervous system and induces the subjective experience of well-being.

Relaxation training has two objectives; the reduction of muscle tension and the reduction of psychological stress as a method of pain control. The basis of the relaxation approach to pain is the belief that organic processes are relevant and that they can be influenced by learning (Linton, 1982). Behaviours that are normally protective in nature become a conditioned response to a variety of stimuli. These behaviours are now destructive to the body. For example, when the body is injured the tendency is to tense the muscles in the injured area, thereby immobilizing it, and protecting it from further trauma. This response is obviously valuable in acute injury. However, if the muscles become chronically tense, the tension itself will produce pain, which in turn creates further tensing. A pain-tension cycle is established (Linton, 1982). One of the objectives of relaxation training is to teach patients to reduce overall as well as specific muscle tension in order to break the cycle.

In the previous section it was shown that anxiety

may be a primary affective component of the chronic pain experience. It is thought that relaxation training can affect three aspects of this anxiety: 1) it lowers the arousal level and thereby reduces the intensity of the reaction; 2) ~~it~~ arrests or reverses rising anxiety levels, thereby reducing the time it takes to dispel the negative effects of anxiety; 3) it reduces the frequency of the known stressors in a person's life (Martin & Heibert, 1985).

Relaxation induction in some form has become an essential feature of many approaches to pain management (Melzack & Wall, 1982). Relaxation has been used extensively with acute pain and is now becoming more widely used in chronic pain management. Linton (1982) completed a critical review of the literature on the behavioural treatments of chronic benign pain other than headaches. In the section on relaxation techniques he concluded that the data suggests that many patients may benefit from relaxation training in pain control. Some of the studies included patients with myofascial pain-dysfunction (Dohrman & Laskin, 1978), back pain (Nouwen & Solinger, 1979), arthritis (Varni, 1981), and temperomandibular joint pain (Casas, Beensterboer & Clark, 1982).

Relaxation training has been used to teach chronic pain patients anxiety reduction techniques (Strenbach,

1974). These techniques have been effective pain management interventions as they help patients deal with the stress of daily living as well as with the stress that is unique to chronic pain.

Another benefit of relaxation training derives from the fact that it is a self-control approach. Patients learn it and institute it when they think fit. Russel (1978) demonstrated that self appraisals of power or potency are major determinants of emotional states. Therefore the patients' assessment of their ability to control experienced or impending physical pain influences the pain's emotional impact (Craig, in press). Melzack and Wall (1982) state that it is possible to change the level of pain by giving people the feeling that they have control over it. Relaxation may aid in this as it is a self-control procedure.

The Problem

The fibrositis syndrome is characterized by chronic, generalized aches and pains, exhaustion and increased tenderness at specific body sites (Smythe, 1979; Yunus et al., 1981). Various studies have postulated that excessive emotional stress exacerbates the symptoms of fibrositis and that relaxation techniques may therefore assist in reducing them (Smythe, 1981; Yunus et al., 1981). There is, however, at the present time, little

empirical data specific to fibrositis to support this recommendation.

The present investigation was designed to test whether relaxation coping strategies (a combination of a modified Jacobson's deep muscle relaxation training, autogenic training and mental imagery), and stressor and stress reaction identification can decrease the symptoms of primary fibrositis on the following variables: the subjective experience of generalized pain, the objective measurement of tender point sensitivity, and sleep integrity. The subjects in this study also monitored their anxiety and depression levels. This research project not only developed a stress management treatment program but field tested this program as well.

Overview

This thesis presents the results of a study designed to address the above problem. In Chapter Two a detailed literature review is presented of the theoretical issues relating to fibrositis, chronic pain, relaxation, and the interrelationship between these concepts. Chapter Three describes the research design and the treatment procedures. In Chapter Four the data analysis and conclusions are presented. Chapter Five focusses on the implications arising from the study and concludes with some suggestions for future research.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

Fibrositis has long been considered to be one of the most common forms of the rheumatic disorders (Graham, 1953; Klinefelter, 1972). One of the most prevalent symptoms of fibrositis is chronic pain. Even though fibrositis has been recognized as a distinct clinical syndrome since 1904 (Gowers, 1904) it remains a medical challenge. Various studies have postulated that excessive stress exacerbates the symptoms of fibrositis and that relaxation techniques may therefore reduce them (Smythe, 1981; Yunis, Masi, Calabro, Miller & Feigenbaum, 1981). In order to understand how relaxation training may be an effective intervention technique in the treatment of fibrositis, it is necessary to review the theoretical basis of each of the components involved. The purpose of this chapter is to provide such a framework. The discussion of the relevant literature is organized into four major divisions in the following order: (a) fibrositis, (b) pain, (c) relaxation training and chronic pain and (d) relaxation techniques.

Fibrositis

Diagnosis

Clinical picture. The fibrositis syndrome is characterised by chronic, generalized aches and pains, exhaustion and increased tenderness at specific body sites (Smythe, 1979a; Yunus et al., 1981). The symptoms usually appear to be exacerbated by several modulators including cold, humidity, too much or too little activity, anxiety and fatigue (Simons, 1976; Smythe, 1979a; Yunus, et al., 1981). The patients' well-preserved musculature is in noticable contrast to their account of continual pain and disability (Smythe, 1981).

Problems in diagnosis occur because of the non-specific and vague localization of much of the generalized pain and because of the absence of any obvious clinical findings. For these reasons fibrositis patients have often received the diagnosis of psychogenic rheumatism (Campbell, Clark, Tindall, Forehand & Bennett, 1983).

Primary vs. secondary fibrositis. The syndrome is considered primary when there is no known cause or contributory disorder (Yunus et al., 1981). It is considered secondary when there is an identifiable associated trauma or another disease state. There may be two kinds of secondary fibrositis. The first is when the

underlying disease produces pain and tenderness. The second is when the original pain is amplified by the same mechanisms that are operating in patients with primary fibrositis (Smythe, 1979b).

Diagnostic criteria. Although the description of the general clinical picture of fibrositis is fairly consistent, there is still debate over what constitutes the specific diagnostic criteria. Prior to 1977 the prime diagnostic indicators of fibrositis were generalized muscle pain, stiffness, exhaustion (Abel, Siebert & Earp, 1939) and trigger points (Travel, Rinzler & Herman, 1942). It was also accepted that the symptoms could be precipitated or accentuated by cold, dampness, drafts or emotional upsets (Graham, 1953).

In 1977 Smythe (Smythe & Moldofsky, 1977) attempted to establish firmer diagnostic criteria for fibrositis. By 1979 Smythe (1979a) had refined these to what he considered to be 5 necessary symptoms: (1) widespread aching of more than three months duration; (2) local tenderness at 12 of 14 specific sites; (3) skin roll tenderness over the upper scapular region; (4) disturbed sleep, with morning fatigue and stiffness; (5) normal ESR, SGOT, rheumatoid factor test, ANF, muscle enzymes, and sacroiliac films.

In 1981 Yunus and his colleagues (Yunus et al., 1981) compared fifty fibrositis patients with fifty normal

controls, using Smythe's criteria. They suggested some changes in the diagnostic criteria based upon their findings. They divided the criteria into three categories: obligatory criteria, major criteria, and minor criteria. There were two obligatory criteria. The first was the presence of generalized aches and pains or prominent stiffness involving three or more anatomical sites, for at least three months. The second was the absence of secondary causes (traumatic, rheumatic, infective, endocrine, or malignant), and normal laboratory tests and roentgenograms. The major criterion was the presence of at least five typical and consistent tender points. The minor criteria consisted of ten types of symptoms: modulation of symptoms by weather factors; aggravation of symptoms by anxiety or stress; poor sleep; general fatigue or tiredness; anxiety; chronic headache; irritable bowel syndrome; subjective swelling; and numbness. For a diagnosis of primary fibrositis to be made all patients must satisfy the two obligatory criteria, as well as the major criterion plus at least three minor criteria. If the patient has only three or four tender points, then the authors suggest that five minor criteria need to be met.

Reynolds (1982) believes that Smythe's description of fibrositis is too broad and runs the risk of incorporating other syndromes, including psychogenic rheumatism. At the

moment however, with the adjustments made by Yunus and his colleagues (1981), it is the most rigid diagnostic standard available.

Generalized pain. The pain or aching of fibrositis is diffuse, poorly circumscribed, and is widely distributed through deep tissues (Smythe, 1979a). Generally, patients experience pain in the broad regions of reference of the cervical and lumbar segments, including the shoulder and pelvic girdles, upper chest, elbow, and knee regions, and hands (Smythe, 1979a). When the pain is referred centrally it is aching in character. When it is referred peripherally it may feel like a swelling, stiffness or numbness (Smythe, 1981). There is a tendency for the patterns of pain to shift, making it difficult for patients to describe the exact location of their pain (Smythe, 1979a).

The aching and pain is affected by cold, changes in the weather, fatigue, anxiety and mental stress (Smythe, 1981). It is now generally accepted that the pain and aching has to have been present for three or more months to meet the diagnostic criteria of fibrositis (Smythe, 1979; Yunus et al., 1981).

Stiffness is often a part of this syndrome. It tends to be felt all over and be worse in the mornings. Like the aching and pain, it is affected by cold, fatigue and mental stress (Smythe, 1981; Yunus et al., 1981). Smythe

(1979a) believes that the presence of stiffness is a necessary part of the diagnostic criteria. However, Yunus et al. (1981) found that 16% of their subjects did not experience any stiffness. Stiffness, although common in fibrositis, may not necessarily be criterion for diagnosis.

Tender points. Originally, tender points were called trigger points (Travell, Rinzler & Herman, 1942), because pain was referred to a distant site by applying pressure on the trigger point. However, in fibrositis, this referred pain is not always produced, and the term 'tender point' is now felt to be more descriptive (Yunus et al., 1981).

The tender points are not always palpable, even though they are sensitive to palpatation. When they are palpable they have been described as nodular, spindle-shaped, or shaped like a band, rope or string (Simons, 1976). They are often unknown to the patient prior to the examination and often not even central to their areas of identified pain (Smythe, 1979a). So far, fourteen tender point sites have been identified which are remarkably constant in location across age, sex and race (Smythe, 1979a). These areas are usually slightly tender on normal subjects. Therefore, it is a combination of the amount of pressure that is needed to elicit pain, the intensity of the pain experienced, and the 'point count'

that contributes to the diagnosis of fibrositis.

To correctly identify a true tender point is a skill that takes practical familiarity. Specific anatomical locations for 14 tender points have been identified, although these are not considered to be all inclusive (Smythe, 1981). How hard to press on these sites is judged by applying pressure to clinically 'silent' areas (i.e. areas that are not normally tender) - the lower ribs, the forearm or thigh muscles or the fat pad medial to the knee (Smythe, 1981). It is suggested that the examiner work at the threshold of tenderness on these sites and then use approximately 80% less of this pressure on the tender sites (Smythe, 1981). A site is considered a tender point if very distinct tenderness is reported. This is often demonstrated by a sudden, dramatic leap known as the 'jump sign' (Smythe, 1979b). The patient tends to recoil in a manner that is out of proportion to the amount of pressure applied (Kraft, Johnson & LeBan, 1968). Some authors also consider an evident verbal response to pain, physical withdrawal of the part or an expression of pain on the face as sufficient criteria for calling the site a tender point (Yunus et al., 1981).

There is some discrepancy as to how many points are needed for a diagnosis of primary fibrositis. Smythe (1979a), the leader in standardizing the diagnostic criteria for fibrositis, believes that 12 of the 14

specified sites must be present. Yunus et al. (1981) found in their study that a minimum of 5 or 6 specific tender points was adequate for diagnosis. This study used 12 tender points as one of the diagnostic criteria.

Laboratory studies. One of the major criterion for a diagnosis of fibrositis is negative routine blood studies. The studies should include cell counts, erythrocyte sedimentation rates (ESR), serum proteins and muscle enzymes (Smythe, 1979a). Roentgenograms of the involved sites should also be negative (Yunus et al., 1981).

Disturbed sleep and fatigue. Fatigue is one of the major complaints of patients with fibrositis. In fact, it may be one of the most disabling symptoms. Patients always feel tired and often wake up feeling more exhausted than when they went to bed (Smythe, 1979a; Yunus et al., 1981). However, even though fatigued, patients may or may not complain of sleeping poorly. If they do sleep poorly, they may or may not relate this to their aches or pains (Yunus, 1981). Campbell et al. (1983) found that the sleep disturbance complaints included difficulty in falling asleep, waking frequently and waking early.

The universal fatigue and the inconsistent sleep patterns may be related to some findings in selective sleep stage deprivation studies. Moldofsky, Scarisbrick, England and Smythe (1975) studied the sleep EEG's of ten

fibrositis patients. They found that all subjects displayed non-rapid-eye-movement (NREM) EEG sleep disturbances. Seven subjects had spontaneous occurrences of alpha wave intrusion into their stage 4 slow wave (NREM) sleep. The remaining three subjects displayed no stage 4 sleep and no, or very little, stage 3 sleep. The generalizability of this study is limited by the small subject number and the fact that one of the criterion for subject selection was a complaint of disturbed sleep for more than three months. However, the second part of this study and a follow-up study (Moldofsky & Scarisbrick, 1976) found that fibrositis symptoms could be induced in normal, healthy subjects by stage 4 sleep deprivation. The auditory stimulus used to arouse the subjects from stage 4 to lighter sleep caused an alpha rythm to intrude on the slow wave (delta rythm) sleep. The consequent EEG pattern was similar to that of the fibrositis subjects. Moldofsky et al. (1975) hypothesized that the disturbance in NREM stage 4 sleep was associated with the appearance of the musculoskeletal and mood symptoms of fibrositis. This would account for the overnight increase in the symptoms of fibrositis patients, especially their pain, stiffness, and fatigue.

Another interesting phenomenon that emerged from this study was that the stage 4 sleep deprivation subjects only heard 2 or 3 out of the often hundreds of stage 4

depriving stimuli. Perhaps fibrositis patients are experiencing alpha wave intrusion of delta wave sleep but are unaware of it. This would account for the fact that some patients complain of sleep disturbances and others do not.

Psychological variables. Many of the patients with fibrositis find that their symptoms are exacerbated by emotional stressors and anxiety (Campbell et al., 1983; Yunus et al., 1981). Smythe (1981) describes the fibrositis patient generally as perfectionistic and demanding of themselves and others. He also states that they deeply resent any suggestion that they are using their illness as a crutch, drive themselves harder than most and dislike relying on chemicals such as alcohol and prescribed drugs. Smythe is the major source used by other authors for this profile. However, it should be clearly understood that empirical data for the support of this profile is currently lacking. There are few studies in this area and those that exist fail to consider a number of important variables.

One of these variables is that fibrositis patients have no observable signs that validate their expressed discomfort. They complain of pain and fatigue while appearing physically healthy. This may elicit different behavioural responses from people around them than would a patient with observable indicators of distress. Observers

may think the patients are exaggerating, faking it, or just not pushing themselves hard enough. The patients may begin to have the same doubts themselves. This will naturally affect their observable behaviour and possibly any test results. Comparing these patients with patients who are either not affected at all or who are not affected as greatly by this variable will produce biased test results.

A second problem is the same problem found in most, if not all, studies of patients with chronic illness. The studies are usually carried out retrospectively and conclusions are then drawn about causative factors. It cannot be determined by retrospective studies whether the current personality profile was a precursor of the illness, or whether the illness contributed to the current personality profile. Conclusions about causation need to be drawn from long-term projective studies.

Another important variable that must be considered is that fibrositis patients have often been previously misdiagnosed (Campbell et al., 1983). Yunus et al. (1981) found that 24% of the patients in their study had experienced unwarranted and often distressing investigations prior to receiving the correct diagnosis. Sixteen percent of these patients had been diagnosed as having psychogenic pain. The patients in this study were seen by a median of three previous physicians (mean of

3.5), with range of 1 to 11. Even with this, more than half the patients (52%) did not have a diagnosis when referred to the study. Seeing various doctors, receiving no diagnosis or a number of different diagnoses, and possibly having been subjected to ineffective treatments (Campbell et al., 1983; Yunus et al., 1981) is a compounding variable that is bound to influence the patient. Their perceptions of themselves and their illness will be affected, which in turn will affect their illness behaviour. This may well account for Smythe's (1979a) description of the fibrositis patient as being that of a patient who is on the defensive, and reacts negatively to any suggestion that the symptoms are of emotional origin or that the patient is inadequate or deliberately malingering.

It can be seen from the above discussion that any study examining the psychological profiles of fibrositis patients needs to recognize that they are a very distinct clinical group. The selection of comparative groups must be carefully chosen before any conclusions can be drawn. Any tests must also be interpreted in light of the confounding variables.

This is not to say that psychological factors do not exacerbate some of the symptoms of this syndrome. Yunus et al. (1981) found that the fibrositis patients differed significantly from the control group in reported anxiety.

Seventy percent of the subjects complained of being unduly anxious and 68% reported that their symptoms were made worse by anxiety and mental states (mental states was undefined). Anxiety correlated with sleep problems, headaches, irritable bowel syndrome, low back pain and tender points at the posterior-iliac crest and the lumbar spine. However, it did not correlate with the stiffness, numbness, fatigue, or subjective swelling. One problem with this study is that the authors do not indicate how the patients' anxiety was measured. It would be interesting to know how the anxiety levels of these patients compared with the norms of recognized psychometric instruments.

Additional symptoms. There are other signs or symptoms that may or may not be present. Smythe (1981) lists the following: the grip test results are weak and variable; there is skinfold tenderness, especially over the upper scapular region; and the skinfold test is often followed by marked reactive hyperemia of the overlying skin.

Yunus et al. (1981) and Campbell et al. (1983) also found a high occurrence of the following signs and symptoms. In many patients the aches, pains, or stiffness were worse in the morning and in the evening, usually when resting after a day's work. A number of patients complained of the feeling of swelling, mostly in articular

or periarticular sites or in the fingers or whole hand. No objective evidence of swelling was found, even though at the time of the examination most of the patients were certain that the areas felt swollen. A large number of patients had irritable bowel syndrome (IBS) and/or headaches, with or without having a history of migraines. Both the headaches and IBS in Yunus et al.'s (1981) study were significantly more frequent among the patients who felt that they were anxious.

Modulators. The symptoms of fibrositis are characteristically made worse by cold, humidity, and sudden changes in the weather (Smythe, 1981; Yumus et al., 1981). Physical fitness may also be a modifying variable. Moldofsky et al., (1975) found that the three physically fit normal subjects, two of whom ran 3 - 7 miles a day, did not experience any symptoms or significant alterations in dolorimeter scores during the stage 4 sleep deprivation study. Other patients have reported that a sedentary state or overactivity exacerbates their symptoms (Yunus et al., 1981).

The subjects in Campbell et al.'s study (1983) felt that excessive emotional stress increased their symptoms. Unfortunately the authors did not specify what these emotional stressors were or how they manifested themselves (i.e. anxiety, depression, excitement, etc.). Half of the patients in this study felt that their fibrositis was

precipitated by injury, illness, or emoticnal stress.

Fibrositis vs. Psychogenic Rheumatism

Although fibrositis is recognized as a distinct syndrome, the literature on how to distinguish it from psychogenic rheumatism is often confusing. Psychogenic pain is described as regional with often sharply defined boundaries by some (Smythe, 1981) and as vague and inconsistent by others (Beetham, 1979; Yunus et al., 1981). Another supposed difference is the response demonstrated by psychogenic patients to physical pressure during examinations. Their reaction is described as exaggerated (Yunus et al., 1981) and as an overreaction with facial grimacing and a touch-me-not withdrawal (Beetham, 1979). However, when the tender points of fibrositis patients are touched their response has also been described as a recoil reaction that is out of proportion to the amount of pressure applied (Kraft, Johnson & LeBan, 1968).

Beetham (1979) states that psychogenic patients wake up tired and not stiff. However, as pointed out earlier, Yunus et al., (1981) found that 16% of their fibrositis patients had no stiffness either, but they all woke up feeling tired. Beetham (1979) states that psychogenic patients complain of various other symptoms including constipation, tension headaches, and indigestion.

Campbell et al. (1983) and Yunus et al. (1981) found these complaints in their fibrositis patients as well.

Finally, psychogenic patients are described as having an inappropriate attitude and appear tense, hostile, nervous and defensive during the examination (Beetham, 1979). This can also fit the description of fibrositis patients as they are often on the defensive during the interview and can easily misinterpret the physician's statements as meaning that they are malingerers or inadequate (Smythe, 1979a). The interview with the fibrositis patient has been described as exhausting for the doctor as well as the patient because of some of these factors (Smythe, 1981).

Perhaps part of the reason for the confusion between fibrositis and psychogenic rheumatism is that much of the assessment relies upon the physician's interpretation of what is an appropriate response and what is not. The physician naturally brings his or her values to the assessment of how patients are reacting physically and emotionally to their presenting symptoms. The physician then has to decide whether or not these reactions are appropriate to the stimuli and make a diagnosis accordingly. A large subjective component is therefore affecting the diagnosis.

There has however been agreement in the literature for a number of years (Hench & Boland, 1946) on some of

the more objective differences between the two diagnoses. Firstly, fibrositis symptoms are modulated by external factors, such as changes in the weather, as well as some internal factors, such as emotional stress. Psychogenic symptoms are modulated by internal factors and characteristically do not vary with external factors (Beetham, 1979; Yunus et al., 1981). Secondly, there appears to be a pattern of diurnal variation in fibrositis, with the symptoms increasing in the early morning and late in the evening. Psychogenic symptoms do not demonstrate this pattern but remain reasonably stable (Klinefelter, 1972). Thirdly, patients with fibrositis can find periodic relief from their symptoms through the application of heat, rest, relaxation or medication (Yunus et al., 1981). Psychogenic patients find that nothing really helps and usually continue without any remittance in their discomfort.

The recent identification of the anatomically distinct and consistent tender points has added to the ability to differentiate between these two diagnoses. These tender points are not only consistent in individual patients but across patients as well. The psychogenic patient does not exhibit the number of tender points required to meet the diagnosis of fibrositis.

It can be seen from the above discussion that it may not be easy to distinguish fibrositis from psychogenic

rheumatism. A correct diagnosis can only be achieved through the taking of a detailed history, a careful physical examination and workup, and an accurate monitoring of symptom modulators.

Prognosis

Fibrositis is a benign condition which may have exacerbations and remissions (Yunus et al., 1981). It may also subside spontaneously although this is unusual (Beetham, 1979). Excellent general health can be expected, and muscle bulk and passive movement of the joints remains normal (Smythe, 1979a). Follow-up studies at regular intervals are important in order to detect the progression of any underlying disease (Beetham, 1979).

The problem with fibrositis arises when pain and exhaustion lead to failing performance and the patient becomes less active (Smythe, 1979a). This can cause them to either resign or be fired from their jobs. A further reduction in their activities and possibly an increase in anxiety, depression, and their symptoms may result. A vicious circle is then established. Smythe (1979a) believes that very few of such patients ever return to full productive capacity.

Fibrositis does not cripple. However it can still have devastating effects and the prognosis for each patient varies.

Etiology

The term "fibrositis" was introduced in the early 1900's by Gowers (1904) in a paper on lumbago. He believed that muscular rheumatism was the result of the inflammation of the fibrous tissue of the muscle. Subsequent histological investigations have usually failed to support this hypothesis (Smythe, 1979a).

Simons (1976), in his excellent review of the literature, has listed the numerous hypotheses that have been offered on the precipitation and aggravation of fibrositis. He divides these into three categories; physical factors, medical factors and pathophysiological factors. Physical factors include chilling of the muscle, trauma leading to bleeding, acute overreaction or chronic strain, habitual poor posture and exposure to toxic substances. Medical factors include acute febrile illnesses, chronic foci infection, and psychogenic factors such as secondary gain, emotional stress and nervous tension. Pathophysiological factors include inflamed connective tissue, impaired circulation leading to local muscle hypoxia, the hyperactive or hyperresponsive reflex neural circuit or some malfunction in the autoimmune process. He concludes by stating that the anatomical structures and physiological mechanisms responsible for the symptoms of fibrositis remain controversial.

Smythe (1979a) hypothesizes that local factors determine the sites of involvement, and the duration and severity of the syndrome are due to a combination of a chronic tension state and the reflex phenomena that accompanies deep pain. Some of the local factors include: local lesions; trauma, either a single incident or recurring over a long period, that creates a soft tissue lesion that results in mechanical instability of a pain-sensitive structure; and exposure to cold or sudden changes in weather that activates mechanisms that are not fully understood. If the pain is in deep body structures, the patient will be unable to identify its locale. Smythe also states that unlike our superficial body parts, we have no cerebral cortical representation (i.e. 'body image') of our deeply lying structures. Pain of deep origin must therefore be referred and misinterpreted as arising in other areas within the body image. Protective reflex changes, such as muscle spasm, increased blood flow, cutaneous or deep hyperalgesia, occur with persitent pain. Since deep pain is referred these reflex effects may be found in areas far removed from the original site. This referred pain may later be reinforced and prolonged by reflex hyperalagesic mechnisms. These symptoms may then be prolonged by chronic tension states that have associated sleep disturbances and possible secondary gains.

In another paper Smythe (1979b) hypothesised that fibrositis may also be a disorder of pain modulation. He suggested that fibrositis patients may have a relative insufficiency of endorphines. However, he did admit that as yet there is no direct experimental data to support this hypothesis. In the study by Campbell et al., (1983) fibrositis patients were compared with the general medical population. Even though the fibrositis patients had many more tender points than the control subjects, the authors were unable to demonstrate that they had diminished pain thresholds and tolerance.

Two interesting sleep studies were carried out by Moldofsky. In one (Moldofsky et al., 1975) it was found that fibrositis patients demonstrated a pattern of EEG sleep disturbance. Their stage 4 sleep (delta wave) exhibited alpha wave intrusion. Three subjects had a complete or almost complete absence of delta wave sleep. In the second study (Moldofsky and Scarisbrick, 1976) normal subjects were deprived of stage 4 sleep and began to experience overwhelming physical tiredness, heaviness or sluggishness to the point of experiencing difficulty with walking or standing up, and an increase in muscle tenderness. Moldofsky proposes a number of hypotheses from these two studies. First, he suggests that a disturbance in NREM stage 4 sleep is related to the symptoms of fibrositis. Second, that traumatic or

emotionally disturbing situations may trigger an endogenous stage 4 sleep disturbance. The ensuing fatigue, irritability, anxiety and musculoskeletal aching and stiffness develops into a destructive, self-perpetuating, nonrestorative sleep cycle.

It has been suggested that fibrositis is of psychogenic origin (Payne et al., 1982). Smythe (1981), however, cites four lines of evidence that support the belief that fibrositis is not purely psychogenic: the predictability of the tender points; the reactive hyperemia; the strong association with a specific sleep disturbance; and the temporary inducement of fibrositis in normal subjects.

At present there is no widely accepted neurophysiologic or pathologic explanation of fibrositis (Simons, 1981). It may be that there is a common end-pathology to a wide variety of traumas (Glyn, 1971). It has even been suggested that patients who are diagnosed as having primary fibrositis may actually have a secondary disease that has not been identified (Wolfe, 1984). Whatever its etiology and pathogenesis, fibrositis is a syndrome that creates a great deal of distress for a large number of people.

Treatment and Management

Medical. Simons (1976) gives an excellent review of

the medical treatments that have been found to have had varying degrees of success with fibrositis. Included in these are massage, acupuncture, exercise, wet heat, mechanical support such as back and neck braces, instructions to the patient such as dietary suggestions, relocation to a dry climate and warm clothing, and vapocoolant sprays over the trigger zone. Smythe (1979a) emphasises the need for a neck brace at night and for exercises to build up the abdominal muscles to support the lower back. Yunus et al. (1981) encouraged their patients to participate in various stretching exercises to keep the muscles supple, to avoid chills, and to use heat in the form of showers or hot packs.

Pharmacological. Drug therapy has ranged from potent anti-inflammatory agents such as corticosteroids through analgesics, tranquilizers, sedatives and diuretics (Simons, 1976). Smythe (1979a) suggests the use of salicylates or other simple analgesics to break the chronic pain cycle. He, as well as others (Yunus et al., 1981) have ascribed to the use of medications such as amitriptylene to help restore sleep. It is believed that this medication reduces alpha wave intrusion. Chlorpromazine has also been used for sleep but leaves morning drowsiness and is unsuitable for long term use. Recently it has been suggested that amitriptyline may also have an independent analgesic action at low doses

(Watson, 1984). Tender points have also been injected with local analgesics such as procaine or xylocaine (Yunus et al., 1981).

Psychological. The literature emphasizes that it is important to reassure patients that their symptoms are benign (Smythe, 1979a; Yunus et al., 1981). Concommitant with this is the conveyance of the fact that their pain and discomfort is real and not "in the head". This is accomplished by an explanation of the pain and the various interacting factors that leads to symptom perpetuation (Yunus et al., 1981). Care is needed in this explanation as patients may be very defensive and ready to interpret what is being said as an accusation of wilful malingering (Smythe, 1979a).

Patients can also be encouraged to use relaxation techniques, take a vacation, change their attitudes towards responsibility, change their lifestyle, and increase their recreational releases (Simons, 1976; Smythe, 1981; Yunus et al., 1981). However, there is little in the literature that describes how these changes are to be accomplished and if these techniques actually do reduce the patients symptoms.

To summarize, although fibrositis is a syndrome that is frequently seen by rheumatologists, little is known

about its etiology and treatment. There are also many variables that must be considered when assessing patients who are experiencing this disorder. There are examples in the research literature where these variables have not been considered and erroneous conclusions have been drawn, to the eventual detriment of these patients.

Various treatments have been suggested for patients with fibrositis. It is only recently that these treatments have begun to be subjected to empirical research. This study hopes to add to this body of information by testing the effects of stress management training on some specific symptoms of fibrositis.

Pain

The field of pain, its perception, manifestation and treatment is vast. The literature is accumulating rapidly as the topic becomes more of a focus of study. Over the past two centuries medicine has directed its attention towards finding cures for pain causing diseases (Melzack & Wall , 1982). The limitations of the disease model are now becoming evident (Fordyce, 1982) and current research is more and more focussing on symptom control (Melzack & Wall, 1982).

One of the discoveries of recent research is that there appears to be a significant difference between the experience of acute and chronic pain (Sternbach, 1978). Acute pain means pain of recent onset. The overall pattern is one of an emergency response that initiates the fight or flight reaction in the body. The pain is intense and usually diminishes and disappears when healing is well under way (Melzack & Wall, 1982). Chronic pain means pain of at least several months duration that has persisted long after all possible healing has occurred, or at least long after it has served any useful purpose (Melzack & Wall, 1982). The pain has now become a medical problem in its own right.

As fibrositis is a chronic pain syndrome this literature review will focus on the empirical findings in the field of chronic pain. Specifically it will review the literature on the theories of pain, the contributing variables, and the use of relaxation training in chronic pain management.

Theories

Prior to 1965 there were two basic theories of pain. The first was the specificity theory. Briefly, the basis of this theory is that there are specific pain receptors that carry messages to specific areas of the brain through specific pain pathways (Melzack & Wall, 1982). The idea is that the sensations we experience are

made specific in the central nervous system. Therefore, no matter how we stimulate this pain pathway we will always experience the same kind of sensation (Cohen, 1980). The problem with this theory is that although it has been demonstrated that there are certain specific pain receptors, it is also known that we do not feel pain in a fixed manner. Our experience of pain sensation changes in response to numerous variables (Cohen, 1980). For example, if we are in a frightening situation we may not realize we have hurt ourselves until we are out of the situation and no longer focussing on survival.

The second set of theories have been grouped together under the heading of 'pattern theory'. Proponents of this theory believe that it is not a particular sense organ or brain receptor which determines what we feel. Rather, our individual sensations depend upon the arrangements of special patterns of nerve fibres and the timing or frequency pattern with which they are stimulated (Cohen, 1980). Pain results when the total output of the nerve cells exceeds a critical level (Melzack & Wall, 1982). The problem with this theory is that it does not take into account the fact that there is a high degree of nerve specialization and that there is selectivity in the central termination of these nerves (Cohen, 1980).

In 1965 Melzack and Wall proposed the gate control theory of pain that has become the basis of modern pain theory (Lipton, 1979). It appears to offer the best explanation so far as to why pain can act so inconsistently. It postulates that at the spinal cord level there is a 'gate' that under certain circumstances allows pain stimulation to pass through to higher centres and at other times suppresses it. The gate is not only under local control from peripheral nerve fibres, but is also modulated through a central descending control mechanism. Therefore cortical activity can affect the gate and this can happen very rapidly (Lipton, 1979; Melzack & Wall, 1982). This is explained in more detail in the section on contributing variables.

Clinicians have long recognized that pain is a complex phenomena. A theoretical framework has now been provided for this observation by the gate control theory. It brings to the forefront the need to view pain as a multidimensional experience comprised of sensory, affective, motivational and cognitive systems (Craig, in press).

Contributing Variables

The gate control theory of pain explains why numerous psychological variables exert an influence on

pain and its perception. It is now well accepted that the pain experienced is not simply a function of the amount of physical damage, but is determined by our previous experience (conditioning), our ability to understand the pain's causes and consequences, our culture, socio-economic status and life-circumstances, our moods, including anxiety and depression, and our assessment of our ability to deal with the pain (Bond, 1980; Craig, 1983; Melzack & Wall, 1982; Merskey, 1974). Pain therefore acquires cultural and social qualities that effect the way we and others respond to it.

The development of pain behavior patterns currently is viewed as having three stages: acute, prechronic and chronic (Keefe, Brown, Scott & Ziesat, 1982). In each of of these three stages the overall response system can be divided into the overt behavioral response, the cognitive/affective response and the physiological response. This theory is explained in more detail below. However it should be stated that at the moment this theory appears to be based on a descriptive summary of what seems to happen and not on an empirical data base. More research needs to be conducted, including longitudinal and retrospective studies of people with chronic pain, to determine if this is actually the process that occurs.

According to this theory patients in the acute

stage (0-2 months) decrease their activities, seek help from professionals, believe their pain is controllable through medical treatment, display an active coping style even though experiencing high levels of anxiety, and experience reactive muscle spasms and autonomic arousal.

In the pre-chronic stage (2-6 months) patients continue to make an active attempt to deal with the pain. They alternate between periods of pushing themselves harder while cutting down on their medication, with periods of passivity, low levels of activity and high medication intake. The danger here is that they push themselves too hard and cause a pattern of flareups leading to an increased dependence on medication and further reinforcemnet of decreased activity and pain behavior. During this stage their pain varies in intensity and becomes more reactive to stressors.

In the chronic stage (6 months or more) patients display stereotyped and firmly entrenched response patterns. Significant others now treat them differently and may encourage them to decrease their activity and provide solicitous attention for pain behaviour. Patients may 'doctor shop' and become preoccupied with their somatic complaints. They experience chronic muscle spasms due to posturing and

guarding behavior, and this can lead to other psychophysiologic disorders such as muscle contraction headaches. They also believe that the pain is uncontrollable and a depressive, passive coping style is adopted.

Sternbach (1974) provides further insight into the variables that contribute to the chronic pain patients experience. He points out that the patient cannot give meaning to their pain. They may understand the explanation given by the doctor, but the pain may still make no sense as it is not acting as a warning signal or protector as they believe pain should. Our culture often dictates that there be a purpose or meaning for suffering and the chronic pain patient is left wondering 'why me?' when there are a lot of people who are more wicked etc. Patients may expend a great deal of energy searching for information that would give meaning to their pain (Craig, 1978). This can result in a great deal of bitterness and anger if patients have to resign themselves to experiencing purposeless, chronic pain.

Chronic pain patients may also experience a feeling of endlessness to their suffering. There is no time limit and no guaranteed end to the pain. Patients may see numerous doctors who prod and poke and who

prescribe different treatments of varying effectiveness. On top of this patients continually live with the impending threat of a further decrease in capacities and an increase in physical distress. These threats can precipitate serious distress in the form of disorganized, hysterical behavior, inappropriate avoidance strategies or substantial physiological arousal (Craig, in press). This may contribute to their sense of helplessness, lack of control, anger and frustration.

This type of reaction has been demonstrated through various personality tests. The Minnesota Multiphasic Personality Inventory has been used to study the profiles of chronic pain patients. The most interesting finding is that those patients that have pain of identifiable organic origin do not differ significantly in their profiles from those having pain that does not have an identifiable organic origin (Sternbach, 1974). All the patients display neurotic patterns, with hypochondriasis and depression as the significant features. In fact, it is common for chronic pain patients to receive a diagnosis of neurotic depression (Sternbach, 1974). This profile displays itself in patients with fibrositis (Payne, Leavitt, Garron, Katz, Golden, Glickman & Vanderplate, 1982).

The life histories of these patients show that most

of them functioned quite adequately at home, at work, and in social situations, prior to the disease or injury that resulted in chronic pain. It seems reasonable to conclude from this that the effect of chronic pain is to cause emotional disturbance (Merskey, 1974; Woodforde & Merskey, 1972) and that psychological processess cannot be ignored even if there is an identified organic basis for the pain (Craig, in press).

It is not suprising, given the number of contributing variables, that anxiety and depression are frequently the dominant accompanying mood states of patients who suffer from chronic pain (Sternbach, 1974). The anxiety can be exacerbated by numerous other factors including anticipation of further pain or life disruption (Craig, in press), fear of being considered neurotic, fear of being denied further medical help (Bond, 1980), fear of losing control over the pain and of one's physical well-being (Melzack & Wall, 1982), and the stress that chronic pain creates in interpersonal relationships and work situations. Clinical studies of patients with chronic benign pain disorders have revealed a link between pain and anxiety. Levels of pain appear to reflect variations in the patient's emotional tensions rather than any substantial change in the disease. In one way then, the

pain acts like an 'emotional barometer' (Sternbach, 1974). All of these factors are pertinent to the experience of the fibrositis patient and makes them prime candidates for potentially high levels of anxiety.

The literature demonstrates that chronically anxious people appear particularly vulnerable to the occurrence and amplification of pain (Craig, in press; Merskey, 1974). During stressful times the body establishes the 'fight-or-flight' response, which leads to an increase in muscle tension, blood pressure, heart rate and adrenalin flow (Selye, 1978). Melzack and Wall (1982) believe that all of this activity may feed into the nervous system producing feelings of tension and irritability, and may either produce pain directly (such as tension headaches) or indirectly by facilitating activity in the neuron pools that project pain signals to the brain. It was discussed earlier in this review that raised levels of anxiety can also be the result of illness and pain. Therefore a vicious cycle of anxiety increasing pain and pain increasing anxiety is often established.

Pain is therefore a complex neurophysiological, behavioral and psychological phenomenon, and as such, demands a multidimensional treatment approach. It is now well accepted that it is possible to reduce many kinds of

clinical pain by means of different psychological therapies (Melzack & Wall, 1982). Bonica (1974) states that all patients with severe, chronic pain require psychological help. Lipton (1979) feels that it is insufficient to treat patients' pain without also treating their anxiety. Therefore, relaxation training is close to becoming one essential component of the psychological approach to chronic pain management.

Relaxation Training and Chronic Pain Management

Relaxation induction in some form has become an essential feature of many forms of pain management (Melzack & Wall, 1982). Relaxation has been used extensively with acute pain and is now becoming more widely used with chronic pain. Why it works is not completely understood although a number of effects have been identified.

The basis of the relaxation approach to pain is the belief that organic processes are relevant and that they can be influenced by learning (Linton, 1982). Behaviours that are normally protective in nature become a conditioned response to a variety of stimuli. These behaviours are now destructive to the body. For example, when the body is injured the tendency is to tense the

muscles in the injured area, thereby immobilizing it, and protecting it from further trauma. This response is obviously valuable in acute injury. However, if the muscles become chronically tense, the tension itself will produce pain, which in turn creates further tensing. A pain-tension cycle is established (Linton, 1982; Merskey, 1974).

Not all of the effects of relaxation on pain reduction can be attributed to a lowering of muscle tension. Studies now show that there is not necessarily a correlation between pain intensity and muscle tension (Philips, 1977). Relaxation may be affecting other psychophysiologic response patterns. Emotional stress, such as anger, depression and anxiety may precipitate substantial autonomic and visceral activity as well as skeletal activity. These changes may exacerbate pain (Craig, in press; Merskey, 1974).

Another theory for the effects of relaxation on pain management has been suggested by Benson (1976). He has proposed that just as the body has an innate 'fight-or-flight' response it also has an innate 'relaxation response'. He and his colleagues believe that this response is the basis of all meditative practices. They suggest that relaxation reduces the activity of the sympathetic nervous system and induces the subjective

experience of well-being.

Relaxation training also incorporates several other psychological techniques that have proved to be effective in pain management. First, the actual relaxation exercise distracts the patient's attention from the painful areas to a different internal feeling. It is recognised that pain is diminished when attention is wilfully directed towards other events (Melzack & Wall, 1982).

Second, relaxation is a self-control approach. Patients learn it and institute it when they think fit. Russell (1978) demonstrated that self-appraisals of power or potency are major determinants of emotional states. Therefore patients' assessment of their ability to control experienced or impending physical pain influences the pain's emotional impact (Craig, in press). Melzack and Wall (1982) state that it is possible to change the level of pain by giving people the feeling that they have control over it.

Third, part of relaxation training involves teaching people to identify what is anxiety producing for them. This provides them with an opportunity to modify the stressors and their reactions to them. If pain

producing stressors can be reduced then concommitantly the pain experienced should be reduced. Relaxation training may reduce pain by effecting three aspects of anxiety: 1) it may lower the arousal level and thereby reduce the intensity of the reaction; 2) it may arrest or reverse rising anxiety levels, thereby reducing the time it takes to dispel the negative effects of anxiety; 3) it may reduce the frequency of controllable stressors in a persons life (Martin & Heibert, 1985).

Linton (1982) completed a critical review of the literature on the behavioral treatments of chronic pain other than headache. In the section on relaxation he concluded that the data suggests that many patients may benefit from relaxation training in pain management. Some of the studies involved patients with myofascial pain-dysfunction (Dohrman & Laskin, 1978), back pain (Nouwen & Solinger, 1979), arthritis (Varni, 1981), and temperomandibular joint pain (Casas, Beensterboer & Clark, 1982). These and other studies have found that not only were there physiological changes as a result of relaxation training but that patients' attitudes to their pain changed. The experience of the pain may be changed because of the alteration in the cognitive and emotional factors involved in the pain experience (Grzesiak, 1977).

In summary, pain is defined as a category of experiences, signifying a multitude of different, unique experiences having different causes and characterized by different qualities varying along a number of sensory and affective dimensions (Melzack & Wall, 1982). The body displays certain physiological responses to psychosocial stressors. Some of these responses have the potential for increasing the perception and manifestation of pain. Relaxation training has been shown to alter the physiological reactions to, as well as an individual's perception of a stressor. Because of this it has been demostrated to be a useful tool in the management of various physical ailments including chronic pain.

Relaxation Techniques

There are currently a number of techniques to induce relaxation including medication, hypnosis, meditation, biofeedback training and progressive muscle relaxation. Progressive muscle relaxation, cue-controlled relaxation and differential relaxation were the methods of treatment in this study. This review will focus on each of these techniques.

Progressive muscle relaxation.

Progressive muscle relaxation (PMR) was developed by

Jacobson (1938). It is a technique that focusses on the physical component of the stress reaction. The primary goal of this technique is to train people to recognize muscle tension throughout the body in order to be able to eliminate unnecessary tension, and thereby induce a state of relaxation (Lehrer, Schoicket, Carrington, & Woolfolk, 1980). Although it is still unclear as to how exactly this procedure produces relaxation, there is ample evidence of its effectiveness as an intervention technique for a number of complaints including hypertension, tension headaches, and chronic muscle tension (Blanchard & Epstein, 1978; Everly & Rosenfeld, 1981; Shoemaker & Tasto, 1975).

The technique involves the subject systematically tensing and relaxing major muscle groups, and focussing on the physiological experience of the change. It is a learned technique and therefore involves regular daily practice. The subject is required to be in a comfortable position, ensure that there will be no disturbances or noise, and preferably be in a darkened room (Benson, 1976).

PMR is an easily learned technique and because of this it is recommended for people who have never been involved in relaxation training before (Hiebert, 1980). Because of PMR's simplicity and versatility the training can be conducted, under a therapist's direction, either

live, by audiotape or with a combination of the two (Israel & Beiman, 1977; Paul & Trimble, 1970; Riddick & Meyer, 1973).

Cue-Controlled Relaxation

One of the goals of relaxation training is to teach people to be able to induce the relaxation response in stressful situations whenever and wherever they require it (Burish & Schwartz, 1980). This naturally calls for techniques that can be used unobtrusively in public situations. A technique that appears to be effective for this is cue-controlled relaxation (Barrios & Shigetomi, 1979). Through a training process the relaxation response becomes a conditioned response to a particular cue. Cue-controlled relaxation has been favourably compared with systematic desensitization (Russell, Wise, & Stratoudakis, 1976), and has been shown to be an effective intervention in anxiety reduction (Guzicki, Coates & Goodwin, 1980; Russell, Miller & June, 1975).

The training for this is simple but must be followed closely to ensure skill acquisition (Barrios & Shigetomi, 1979). A specific cue is placed at the end of the relaxation practice session when the subject is fully relaxed. This is practiced until the subject can return to a fully relaxed state with the cue. It is through this frequent practice that the cue becomes associated with a

fully relaxed state and then, theoretically, becomes a conditioned response which can elicit the relaxation response (Barrios & Shigetomi, 1979). The subject introduces this technique in-vivo in a slow graduated manner, beginning with non-stressful situations and advancing to more stressful situations only when proficient at the current stage.

Differential Relaxation

Differential relaxation is based on the concept that only certain muscles are required for each activity and that these muscles need only be tensed to a certain degree. The technique therefore focusses on training people to relax the nonessential muscles and to tense the essential muscles only as much as necessary (Walker, 1975). Through regular practice sessions subjects are taught to recognize essential and nonessential muscle groups for a variety of activities and to relax each accordingly (Appendix F and Appendix J).

Physiological Measures of Relaxation

It has been shown that the stress reaction increases the activity of the sympathetic nervous system. This results in physiological changes such as increased heart and respiration rate, muscle tension, and endocrine secretion (Bensen, 1975; Budzynski & Peffer, 1980).

Conversly, relaxation training appears to reduce the activity of the sympathetic nervous system (Bensen, Greenwood & Klemchuck, 1975; Budzynski & Peffer, 1980).

It is because of the above factors that physiological measures such as heart and respiration rate and peripheral skin temperature have been used as measurement outcomes for determining the level and effects of relaxation training (Corson, Schneider, Biondi & Myers, 1980; Hiebert, 1980).

Summary

This literature review has focussed on the main issues involved in fibrositis, pain, chronic pain and relaxation training, and the actual relaxation procedures themselves. It has been shown that fibrositis is a complex syndrome and that little can yet be offered in the way of treatment. One of the most distressing symptoms of fibrositis is chronic pain. Other studies have demonstrated the effectiveness of relaxation and stress management training in either reducing chronic pain, or in assisting patients with chronic pain to regain some control over their symptoms. There is every indication therefore that similar procedures will be as effective with the symptoms of fibrositis.

Hypotheses

The above considerations have been formulated into the following hypotheses:

1. Subjects receiving stress reduction training will experience a reduction in tender point sensitivity, as measured by a dolorimeter.
2. Subjects receiving stress reduction training will experience a decrement in the subjective experience of pain as evidenced by end of treatment and post treatment scores on the McGill Pain Questionnaire, the Arthritis Impact Measurement Scales, and self-monitoring pain charts.
3. Subjects receiving stress reduction training will experience a reduction in their levels of anxiety and depression as evidenced by score comparisons on measures of anxiety and depression.
4. Subjects receiving stress reduction training will experience an increase in the total amount of sleep obtained per night as measured by their self monitoring booklets.

CHAPTER 3

DESIGN AND METHODOLOGY

Originally this research project was designed to test the effects of stress management training on the symptoms of fibrositis via a group comparison method. The original design called for 100 subjects to be assigned randomly to one of four groups: control group, medication group, experimental group, and benign treatment group. After several months it became obvious that not enough subjects were available for this research design and the project was redesigned on a single-subject multiple base line across subjects format.

Single-Subject Design

Historical Basis

Single subject designs have been used for a number of years in many areas of research, including education, rehabilitation, psychology, and many other disciplines (Kazdin, 1982). Although single subject designs have been a somewhat neglected research method for a number of years there has been a recent resurgence of interest in their use in experimental psychology (Hersen & Barlow, 1976;

Kazdin, 1982). In fact single-subject design was a founding research methodology for modern behaviour modification techniques. Kazdin (1982) points out that much of traditional research was based on the careful investigation of individuals rather than on between group comparisons. As examples of this he cites the work of researchers such as Pavlov (1849-1936) whose experiments were based primarily on the study of one or a few animals at a time, Thorndike (1874-1949) whose best known work is his investigation of cats' escape from puzzle boxes, and B.F. Skinner (1904) whose single-subject research became the basis for operant conditioning.

There are also historical examples of the use of single-subject designs in clinical psychology. Kazdin (1982) once again gives examples of people who have been a major influence in the development of modern clinical psychology. Freud (1856-1939) used data derived from the in-depth study of individual cases to develop his theory of personality and behaviour (e.g., Little Hans, Anna O.). Watson in 1920 made a major contribution to the understanding of the development of the fear reaction through the now well known case of the infant Albert. These are just a few of the examples that are present in the literature demonstrating the contribution single-subject designs have made to the formulation of the theoretical basis of present day psychology (Hersen &

Barlow, 1976; Kazdin, 1982).

Advantages

Single-subject design is based on the philosophy that valuable information can be obtained by studying the variables that affect individual performance rather than groups of persons. The ultimate goal of this attempt to identify laws of individual performance is to discover generalizable relationships (Kazdin, 1982). As Hersen and Barlow (1976) point out, if behaviour is lawful, then the identification of the sources of variabilty in one subject should offer important information about the sources of variability in similar subjects undergoing the same treatments.

To this end single-subject designs do have some advantages over group comparison methods. First, group comparison designs demand large numbers of homogeneous subjects. This naturally calls for the investment of an enormous amount of time and money. Often the number of subjects needed are not available or the procedures required for the study are beyond the experimenter's budget or ability's. Single-subject designs can bring the study within the experimenter's resources and subject availability.

Second, one of the criticisms levelled against between group comparisons is that the results may not be relevant to clinicians. Statistical significance in an

experiment does not necessarily mean clinical significance. The difference between statistical significance and clinical significance often becomes overlooked in research (Hersen & Barlow, 1976). Single-subject design is based on the continual monitoring of the subject's behaviour. The effectiveness of a technique is judged on clinical improvement and not statistical improvement. This consideration does not negate the use of statistics in single-subject designs. The controversy in the literature concerning the appropriateness of statistical procedures with single-subject designs is well documented by Hersen and Barlow (1976). Researchers that advocate the use of statistics believe that they are appropriate when it is difficult to establish stable baseline rates of behaviour, when variables with unestablished effects are being investigated, and when there is a relatively large intra-subject variability (Hersen & Barlow, 1976). It was decided not to use statistical procedures in this study as none of these factors applied to this research project. However, statistical tests for single-subject designs are slowly becoming more popular and have included t and F tests, time-series analysis, randomization tests, Rn test of rank, and split-middle technique (Hersen & Barlow, 1976; Kazdin, 1982). The advantages and disadvantages of each of these tests are described in detail by Hersen and

Barlow (1976) and Kazdin (1982).

A third advantage of single-subject design lies in opportunity it affords to assess individual variability. In group comparisons individual variability of the subject's response to the intervention is lost in the compilation of the group data. Inter-subject variability is the rule rather than the exception in research (Hersen & Barlow, 1976), and yet group comparison methods shed no light on this variability. In reality it may be more important to know why certain subjects did or did not improve from treatment than it is to know the group result. Bergin (1966) clearly demonstrated that years were lost to applied research because investigators overlooked the differences in effect of treatment on some subjects. Single-subject designs by their nature avoid this type of pitfall.

Fourth, group comparison designs present problems in the generalizability of the results to individuals. Theoretically, this research design is based on obtaining a truly random sample. In most studies, however, subjects are chosen on the basis of their availability and are then randomly assigned to groups that are matched on relevant characteristics (Hersen & Barlow, 1976). These types of procedures create problems. Since the subjects are not a true random sample the results cannot be generalized to the population. However, since the group is heterogeneous

on any number of characteristics the results cannot be generalized to an individual. Hersen and Barlow (1976) contend therefore that it is logical to generalize the results from a single individual whose response and biographical characteristics have been well specified, as is the case in single-subject design.

Single-subject design is also a useful technique for testing the effectiveness of treatment packages. Treatment packages are usually multifaceted and contain several different ingredients. Single-subject designs allow for the immediate analysis and manipulation of the variables during the research process. Therefore it is possible with this type of research methodology to test the various components of a treatment package in order to understand, adjust and refine the overall package prior to testing its group effectiveness (Kazdin, 1982).

Limitations

Although there are some distinct advantages to using single-subject designs there are also some limitations. First, single-subject designs have been primarily used in outcome research, that is to assess the efffectiveness of a particular intervention (Kazdin, 1982). However, it is not possible to use single-subject designs for comparing the effect of different interventions or variations of a particular intervention for the same behaviour disorder (Hersen & Barlow, 1976). The reason for this is that most

designs institute different experimental conditions at different points in time. As a result a number of extraneous variables may be confounding the treatment outcome, such as the sequence of treatment introduction or the interaction of treatment and sequence (Kazdin, 1982).

Second, single-subject designs are not as effective as group comparison designs in addressing the issue of which clients are best suited for the treatment (Kazdin, 1982). Between group comparisons can accomplish this through factoral designs where subjects are grouped on a number of variables (such as age and sex) that may be relevant to treatment outcome (Hersen & Barlow, 1976). In single-case designs the researcher has no systematic way of determining whether outcome effects were the result of treatment or of subject characteristics (Kazdin, 1982). This difficulty can be confounded if only a small number of subjects are used to assess the effects of a particular treatment intervention. It may be that the subjects were all either idiosyncratic nonresponders or responders. Even though it is possible to generalize the findings of single-subject research designs it is the above factors that make it more difficult to assess the factors that contribute to this generality (Kazdin, 1982).

It is for the above reasons that many researchers believe that a single-subject design may be a good way of the starting an investigation of an intervention technique

but not of ending it (Leitenberg, 1973). Single-subject designs allow for the identification of individual sources of variability and the manipulation and adjustment of the critical components of the treatment intervention or package. Hersen and Barlow (1976) contend that it is then advisable to test the intervention in a large group outcome study since the researcher is now less concerned with individual variability and more concerned with the magnitude of treatment effect.

Methodology

There are various types of single-subject designs (refer to Hersen & Barlow, 1976, and Kazdin, 1982, for specific details and instructions on use). However, they are all based on the continual monitoring of the subjects behaviour. This research project used a multiple-baseline across subjects design. This method measures the effect of treatment across a number of subjects. Baselines are obtained on all subjects, and once these are stable the intervention is introduced to different subjects at different points in time. It is basically an AB research design where A is baseline and B is the intervention. The dependent measures are continually monitored throughout the research project. If each subjects baseline changes when the intervention is introduced, then the effects of this change may be attributable to the intervention and not to extraneous variables (Kazdin, 1982).

This method was chosen for this research project for a number of reasons. First, it was not possible to institute a reversal phase in the design as is required in an ABAB design. Subjects were instructed in the use of relaxation procedures. It could not be guaranteed that the subjects would stop using these techniques if instructed to. Second, the subjects were using the relaxation techniques for pain management. Even if it were possible to ensure that the subjects stopped using the relaxation techniques when instructed to, it raised the question of whether it was ethical to make this request. Discontinuing the intervention technique may have increased or prolonged their discomfort. Given these considerations it was decided that the multiple-baseline across subjects design would provide the necessary information while controlling for some of the problems inherent in ABAB designs (Hersen & Barlow, 1976; Kazdin, 1982).

Generalizability

It is a well accepted precept of research that the identification of sources of variability increases the ability of the researcher to generalize the results. Sidman (1960) points out that it is unrealistic to expect that a given variable will have the same effect on all subjects under all conditions. Therefore by identifying and controlling a greater number of conditions affecting a

particular intervention, it is possible to decrease the variability of that intervention. It should then be possible to obtain the same results in a greater number of subjects. Single-subject designs allow for this identification and control of a number of variables within the experimental operation.

Single-subject designs allow for the replication of the study not only across subjects but also across therapists and across settings. The original experiment can be replicated a number of times across each of these variables. Because of this, Hersen and Barlow (1976) contend that in terms of validity or generality of findings the single-subject design can far surpass the experimental/no treatment control group design.

Single-subject design uses the subject as his/her own control. Because of this it is possible to estimate the effect of environmental factors in treatment outcomes by either observing the degree of deterioration when treatment is withdrawn, or by identifying patterns of response across subjects when treatment is introduced (Hersen & Barlow, 1976).

Many proponents of single-subject designs believe that this research approach may have as much internal validity (i.e., the power of the design to isolate independent variables responsible for intervention effects) and external validity (i.e., the ability to

generalize findings across subjects, settings and therapists) as group designs with no-treatment controls (Hersen & Barlow, 1976; Kazdin, 1982; Paul, 1967). Kazdin also states that the stringent criteria applied for evaluating the effectiveness of treatment in single-subject research may identify interventions that are more potent and generalizable than those evaluated by statistical techniques.

Summary

Single-subject designs hold many advantages for the clinical researcher. Their flexibility and time, budget and subject requirements may make them the research method of choice for a number of clinical experiments. The design also allows for the identification and control of contributing variables, making them a powerful tool for the development and testing of new intervention strategies.

Sample

Sample Selection

A letter was mailed to rheumatologists associated with the Arthritis Society, B.C. Division asking them to participate in the study by referring patients that had been newly diagnosed as having fibrositis. The letter described the study, the inclusion and exclusion criteria

for subject selection, and what was expected of the referring rheumatologist (Appendix A). The rheumatologists also received a sheet which gave a standardized format of how to explain fibrositis to the patient (Appendix B). This was to ensure that all patients received the same type and amount of information about this syndrome. A study information sheet was included in the package mailed to the rheumatologists (Appendix C). This sheet told the patient about the study and what was expected of them if they agreed to participate. It also emphasized that their medical treatment would not be compromised if they did not wish to participate, and that they could withdraw from the study at any time without jeopardizing further treatment.

Once the rheumatologist referred a willing subject, the patient received a standardized physical exam at the Arthritis Society to ensure diagnostic purity. They were also given the Zung Self-Rating Depression Scale (Zung, 1965) to screen for profound clinical depression. Those subjects that were excluded from the study were referred back to their rheumatologist with an explanatory letter. Three subjects met the study criteria and were asked to sign a consent form (Appendix D) and complete a demographic data form (Appendix E).

Subject Profiles

A detailed profile of the subjects is provided in Tables 1 - 4.

Table 1
Demographic Data

Descriptors	Subject 1	Subject 2	Subject 3
Sex	Female	Female	Female
Age	53	56	62
Working	No	No	No
Disability Pension	No	No	No

Table 2
History of Symptoms

Descriptors	Subject 1	Subject 2	Subject 3
Years of Muscle Pain/Tension	5+	2+ to 5	5+
1st. Contact With Doctor	5+ years	2+ to 5 years	5+ years
# of Doctors Seen	3 or 4	3 or 4	3 or 4
# of Other Diagnosis for Symptoms	0	2	2
Previous Treatment/s	Medication	Medication Physio. T.N.S.	Medication Physio. Acupuncture

Table 3
Symptom Intensity

Decsriptors	Subject 1	Subject 2	Subject 3
# of Years Symptoms Have Interfered With Activities	2+ to 5	2+ to 5	2+ to 5
% Of Time In Pain	75%	50%	75%
What Increases Symptoms	Cold Weather Chge. Exercise Overtired	Stress Exercise Anxiety	Cold Weather Chge. Emot. Upsets Stress Anxiety Heat
What Decrease Symptoms	Heat Medication	Heat Medication	Heat Medication Rest Recreation
Trouble Getting To Sleep	Often	Rarely	Sometimes
Feel Tired In The Morning	Often	Sometimes	Often
Feel Tired During the Day	Often	Sometimes	Often
Do Symptoms Interfere With:			
Activity	Often	Often	Often
Work	Often	Often	Often
Socialization	Rarely	Sometimes	Often
Personal Relat.	Rarely	Rarely	Sometimes

Table 4

Affective Variables

Descriptors	Subject 1	Subject 2	Subject 3
Do You Believe You Have Control Over Your Pain	No	Somewhat	Somewhat
Do You Have The Following Moods:			
Depression	Rarely	Rarely	Sometimes
Anxiety	Rarely	Sometimes	Sometimes
Anger	Rarely	Sometimes	Rarely
Frustration	Often	Sometimes	Sometimes
Do Emotions Affect Symptoms	Rarely	Some of the time	Rarely

Research Design

Three subjects were chosen for this single subject multiple base line across subjects research project. All subjects monitored their pain, medication intake and sleep patterns for 4 weeks pretreatment (baseline), 6 weeks treatment, and 4 weeks posttreatment follow-up. They met individually with the researcher once a week during the length of the study and handed in the self-monitored data at this time. Each subject received a standardized six week stress reduction training program. Participants were tested individually at study entry, pretreatment, post-treatment and poststudy on self-report measures and dolorimeter readings.

Scheduling of appointments paralleled each other in order to control for effects related to the time of day

for testing. Due to the slowness of subject referral, subjects started in the study as soon as they met study requirements. It was therefore not possible to standardize the length of time between subject start dates.

Dependent Measures

Three types of dependent measures were used in this study: self-report questionnaires, including the State-Trait Anxiety Inventory (STAI) (Spielberger, 1968), the Arthritis Impact Measurement Scales (AIMS) (Meenan, Gertman, Mason & Dunaif, 1982), the Beck Depresssion Inventory (Beck, Ward, Mendelson, Mock & Erbaugh, 1961), and the McGill Pain Questionnaire (MPQ) (Melzack, 1975); the dolorimeter (pressure algometer, Chatillon, New York, N.Y.); and self monitoring charts on pain levels, medication intake and sleep integrity. All dependent measures were tested under pre-study, pre-treatment, post-treatment and post-study conditions.

State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory (STAI) is a self-evaluation questionnaire based on a theoretical distinction between state anxiety (STAI-S), a transitory condition of perceived anxiety, and trait anxiety (STAI-T), a relatively stable condition of anxiety proneness. The STAI consists of forty brief items: 20 to

assess "how you feel now" (STAI-S), and 20 to assess "how you generally feel" (STAI-T). Both forms were used in this study. Norms for this scale are based on 377 high school juniors, 982 college freshmen, 484 college students enrolled in an introductory psychology course, 461 male neuropsychiatric patients, 161 general medical and surgical patients, and 212 prisoners. The scale demonstrates adequate reliability (Kendall, Finch, Auerbach, Hooke & Mikeula, 1976), and validity (Kendall et al., 1976; Spielberger, Gorsuch & Lushene, 1970). Because the STAI so patently appears to be what it purports to be, it is open to faking to a greater extent than more subtle self-report tests (Dreger, 1965). The examinor is therefore advised to ascertain independently whether examinees would be likely to bias their responses and in what direction (Dreger, 1965). Test-retest stability coefficents for the STAI-T range from .73 to .86 (Spielberger, et al., 1970). However, they tend to be low for the STAI-S scale, median r=.32. This result is to be expected as the STAI-S scale is designed to measure situational influences at the time of testing and not a persistent characteristic of the individual (Spielberger et al., 1970). Internal consistency ranges from .83 to .92 (Spielberger et al., 1970). The correlation between the STAI-T and the IPAT (Cattell, 1957) ranges between .75 and .77 (Spielberger et al., 1970), indicating adequate

concurrent validity.

The Arthritis Impact Measurement Scales

The Arthritis Impact Measurement Scales (AIMS) are a battery of self-evaluation health status questions aimed at assessing the physical, emotional and social well-being of individuals with with rheumatic diseases. Since fibrositis is a rheumatic syndrome, and since there is no scale designed specifically for this syndrome, these scales were chosen for this study. The 45 health status questions are grouped into nine component scales: Mobility, Physical Activity, Dexterity, Household Activities, Activities of Daily Living, Anxiety, Depression, Social Activity, and Pain. The scales contain 4-7 items, and each item contains 2-6 possible responses. Item responses are summed by group to produce scale scores and then brought to a normal standard score of 0-10 for further analysis.

The norms for the scales are based on 625 patients: 336 with rheumatoid arthritis, 108 with osteoarthritis, 57 with systematic lupus erythematosis, 34 with seronegative variants, and 61 with other diseases, including soft-tissue rheumatism, and crystal-associated arthropathy (Meenan, Gertman, Mason & Dunaif, 1982). The scales demonstrate adequate reliability with an internal consistency alpha of .70, a Guttman coefficient of reproducibility of .90, and a test-retest stability

coefficient of .80 (Meenan, et al., 1982). Validity was assessed by three methods: correlating normal scores with general and specific clinical measures in disease activity; performing a factor analysis on each group of items to determine if it identified a single factor; and runnning a series of multiple regressions on the AIMS as a whole, using patients' and physicians' estimates of overall health status as the dependent variables (Meenan et al., 1982). The results showed that all nine scales were significantly correlated with both general and specific clinical measures, that all scales except Household Activities loaded on a single factor, and that the nine scales taken together explained at least 60% of the variance in the four summary health status estimates generated by physicians and patients (Meenan, 1982).

The generalizability of the AIMS was assessed by repeating the validity and reliability analyses in a variety of sociodemographic, diagnostic, and functional subsets. The results closely resembled the findings for the overall sample and indicate that the AIMS can be used in a variety of clinical settings, and that this one instrument has broad applications across disease and demographic groups (Meenan et al., 1982).

The McGill Pain Questionnaire

The McGill Pain Questionnaire (MPQ) represents an

attempt to develop a multidimensional measure of pain. It contains 20 categories of verbal descriptors that are considered to be representative of three major classifications of the experience of pain: words that describe sensory qualities (temporal, spatial, pressure, thermal and other properties); words that describe the affective qualities (tension, fear, and autonomic properties); and evaluative words (subjective overall intensity of the total pain experience), (Melzack, 1975). Although patients fill out the questionnaire themselves it is advised that the examiner be present in order to ensure that instructions are followed and that the patient understands the meaning of the words. The data from the MPQ can be analysed in four ways: the pain rating index based on the mean scale values (PRI-S), the pain rating index based on the rank values of the words (PRI-R), the number of words chosen (NWC), and the present pain intensity (PPI) which is an indicator of overall pain intensity at the time that the test is taken (Melzack, 1975). All four indices were used in this study.

In the development of the questionnaire, subjects were asked to classify 102 words obtained from the clinical pain literature into smaller groups that described different aspects of their pain experience (Melzack, 1975). These words were then classified into the three major classes and 16 subclasses. Next, an

attempt was made to determine the pain intensities implied by the words in each subclass. A numerical scale was devised that ranged from least pain to most excruciating pain. Doctors, students and patients were asked to assign an intensity value to each word. Although the precise intensity scale values varied between groups, the positions of the words relative to each other were the same (Melzack, 1975). Numerous factor analytic studies have been conducted that give credence to the conceptualization of pain as a 3-dimensional phenomena (Byrne, Troy, Bradely, Marchisello, Geisinger, Van der Heide & Prieto, 1982; Prieto, Hopson, Bradely, Byrne, Geisinger, Midox & Marchisello, 1980; Reading, 1979).

Test-retest studies have yielded evidence to suggest that there is consistency in an individual's choice of category scales across a one week time period (Fox & Melzack, 1976; Melzack, 1975; Melzack & Perry, 1975). Studies have also been conducted on the correlations between the various methods of scoring (Melzack, 1975). The correlation between the PRI-S and the PRI-R is high (0.9 or higher for all catagories). The NWC correlates highly with the PRI-S ($r = 0.97$) and the PRI-R ($r = 0.89$). The correlation coefficients between the PPI and other indices are: NWC 0.32, PRI-R 0.42, PRI-S 0.42. Melzack (1975) hypothesizes that although the PPI correlations with the NWC and the PRI are statistically significant,

the low correlations may be indicative that a large part of the variance may be determined by other factors. The PPI appears to display less consistency and be more susceptible to influence by other variables (Melzack, 1975). However, when changes in pain are examined the correlations between the PPI and the PRI-R are 0.94 (Melzack, 1975). The original PPI score and the words that comprise the PRI-R may show considerable variability. However, any changes in the pain indicated on the two measures are remarkably consistent. These results indicate that the MPQ is a usefull tool for measuring the effect of various pain intervention methods.

The Beck Depression Inventory

The Beck Depression Inventory (BDI) is a self-report measure developed to provide a quantitative assessment of the intensity of depression. It is aimed at registering varying degrees of depression along a continuum and is not designed to distinguish amoung standard diagnostic categories (Beck, Ward, Mendelson, Mock & Erbaugh, 1961).

The inventory is composed of 21 categories of symptoms and attitutudes that describe a specific behavioural manifestation of depression. Within each category there are 4 to 5 self-evaluative statements that are ranked to reflect the severity of the symptom. Each statement is assigned a numerical value from 0-3 where zero equals neutral and three equals maximal severity.

The examinee reads the statements and circles the appropriate rating.

The items in the inventory were primarily clinically derived. They were chosen because of their relationship to the behavioural manifestations of depression and not because they reflect any theory regarding the etiology or underlying processes in depression (Beck et al., 1961). For the development of the inventory systematic observations and records of the characteristic attitudes and symptoms of depressed patients were made. The patients for this initial study were chosen because their attitudes and symptoms were consistent with the descriptions of depression in the psychiatric literature. It was from these observations that the 21 items were derived.

The inventory is based on the study of 409 patients who were drawn from routine admissions to psychiatric outpatient and inpatient departments of two hospitals in two separate studies. The patients were seen either directly before or after the administration of the inventory by experienced psychiatrists. The psychiatrist formulated a psychiatric diagnosis and filled out a comprehensive study form. Four psychiatrists participated in the study. They all met prior to the study and agreed on the criteria to be used in making their clinical judgements, and developed a detailed instruction manual

that served as a guide in their diagnostic evaluations (Beck, et al., 1961). Two randomly paired psychiatrists interviewed the patient and the other two observed the process through a one-way screen. They then established a diagnosis for each patient as well as estimating the degree of depression. The agreement amoung the psychiatrists regarding the major diagnostic category was 73%, while their agreement about depth of depression was 97%. These ratings were then compared with their BDI rating and obtained correlation coefficients of r=0.65 and 0.67.

Two methods were used for evaluating the internal consistency of the B.D.I. First, the protocols of 200 patients were analyzed. The score for each of the 21 categories was compared with the individuals total BDI score and this was then submitted to statistical analysis. All categories showed a significant relationship to the total score (Beck, et al., 1961). Second, the split-half reliability was determined on 97 cases and demonstrated an r=0.86 which rose to r=0.93 with a Spearman-Brown correction (Beck, et al., 1961).

Two indirect methods were used for estimating the reliability of the inventory. First, the BDI was administered to 38 patients at two different times, and the results were then compared to the depth of depression rating made by one of the psychiatrists. The two scores

closely paralleled each other in the direction of the changes (Beck et al., 1961). Second, each of the scores obtained by the psychiatrists were plotted against the clinical ratings. A high degree of agreement among the interveiwers was observed for the mean of both scores obtained at each level of depression (Beck, et al., 1961).

The Mann-Whitney U test was used to appraise the power of the BDI to discriminate between the specific depth of depression categories. Significance was shown at <0.0004 in the difference between adjacent categories (i.e., none, mild, moderate, severe), except for between the moderate and severe categories which had a p-value of <0.1 in Study I and <0.02 in Study II (Beck et al., 1961).

The BDI has been compared to many other depression measures including the Form E of the Depression Adjective Checklist (Lubin, 1967) and the Generalized Contentment Scale (Byerly & Carlson, 1982; Hudson & Proctor, 1977). The forms were compared on two groups: psychiatric inpatients and psychiatric outpatients. For the inpatient sample each scales correlations were identical at 0.73, while in the outpatient sample the BDI correlated with the Depression Adjective Checklist Form E 0.67, and with the Generalized Contentment Scale 0.80 (Byerly & Carlson, 1982). These results indicate adequate concurrent validity. This same study also computed Kuder-Richardson reliabilites for all three scales. BDI reliabilities were

0.86 for inpatients and 0.81 for the outpatients (Byerly & Carlson, 1982).

The BDI has been a useful assessment tool for a number of years for a variety of reasons (Beck et al., 1961). It provides a standardized measure that is not related to the theoretical orientation or personal characteristics of the tester. It can be easily taught and administered. Since the inventory provides a numerical score it allows for the comparison of quantitative data. Finally, it reflects the changes in the depth of depression over time and therefore provides an objective measure of treatment outcome.

The Dolorimeter

The dolorimeter (pressure algometer, Chatillon, New York, N.Y.) is a spring loaded gauge with a range of 0-9 kg, with a protective rubber stopper (1.54 cm2) attached to the plunger. The instrument is used to measure quantitive musculoskeletal tenderness. In this study the participating rheumatologist administered the testing. The area to be tested was lightly palpitated first to identify the most tender point. The dolorimeter was then placed directly over the point and force applied slowly and steadiliy. The patient was asked to verbally identify when pain first began and the score was recorded in tenderness units on the appropriate form. The dolorimeter

has been used in previous research into articular tenderness (McCarty, Gatter & Phelps, 1965), and fibrositis (Cambell, Clark, Tindall, Forehand & Bennett, 1983).

There are some difficulties with using the dolorimeter for precise tenderness measurement (McCarty et al., 1965). First, there is the problem of ensuring that readings are taken from the exact same spot when there are long gaps between testings. Second, readings taken on areas that may be padded with fat or muscle may not be accurate. Third, the rate of application of force is an important variable. A slower rate produces higher scores because of the temporal summation of painful impulses. It may also be difficult to produce the same rate of force across testings to ensure uniformity of results. Despite these limitations the only alternative so far to the dolorimeter is manual palpitation, which offers similar problems and is more difficult to quantify.

Self-Monitoring Charts

Subjects were given self-monitoring booklets weekly. Each booklet contained a chart for each day of the week listing a five point pain rating scale on one axis and an hourly time scale on the other. The front of each booklet contained an explanation of the five point pain scale: 0 = no pain; 1 = very low level - aware of it only at times;

2 = pain level can be ignored at times; 3 = painful, but can continue to work; 4 = severe, makes concentration difficult; 5 = intense, incapacitating. Subjects were instructed to rate their pain level each waking hour, to mark by the appropriate hour what medication they took, and to mark when they went to bed, when they fell asleep, and the number and length of sleep interruptions. There was also a place on the booklet where subjects could make notes about any unusual daily activities or occurrences (e.g. more than normal physical activity, family disturbances etc.). Each subject was given the same explanation on how to use the booklet and asked to practice using it in the researcher's presence prior to the commencement of the study. Subjects were also taught how to monitor their pulse and respirations prior to beginning treatment. The accuracy of their observations were tested by the researcher at this time and at the end of treatment. They were asked to record their pulse and respiration rates before and after every relaxation practice session.

Facilities

All testing and treatment sessions were held at the Arthritis Society in Vancouver. Testing occurred during office hours to ensure the availability of the participating rheumatologist. Testing was conducted in a

private office made available for this purpose. All treatment sessions were held after hours to ensure a quiet environment free of interruptions.

Staff

The therapist was a female, senior masters student in counselling psychology, who had five years clinical experience and had completed two counselling practica. The therapist administered and scored the self-evaluation measures, conducted the stress reduction training and compiled all the data. The participating rheumatologist was a male, and is the Medical Director of the Arthritis Society. The rheumatologist was responsible for the prescreening physical exams and the dolorimeter measures.

Treatment Procedures

Pre-Treatment

After subjects were screened and deemed appropriate for the study they were asked to re-read the study information sheet (Appendix C) and sign the consent form (Appendix D). They then completed the entry study testing, and were trained in the use of the self-monitoring booklets. They were asked to begin using the booklet and given appointments for the next four weeks where they could hand in their booklet and receive the one for the next week. At the end of this time they

participated in the pretreatment testing and appointments were scheduled for the six weeks of treatment.

Treatment

Treatment sessions were held for six consecutive weeks. Each subject was seen individually for approximately 50 minutes each time: 20 minutes for theory, 20 minutes devoted to practice and 10 minutes for summarization. The goals of the training program were to teach the subjects how to identify their particular stressors and stress responses and how to use techniques such as deep muscle relaxation, cue-controlled relaxation and differential relaxation to help them cope with these stress responses. Each session followed the same format. The session was overviewed, self-monitoring sheets were collected, home practice was reviewed and any questions answered, new concepts were introduced, the concepts were practiced, the session was summarized, and homework was assigned. The following is a session by session outline of the stress management training program (Appendix F for detailed lesson plans).

Session One

Session one focussed on the theoretical basis of the training program. Subjects were informed that there are three main views of stress. The first view conceptualizes stress as a reaction to environmental pressures and

therefore focusses on altering the person's environment. The second view states that stress is the result of the body's response to the demands placed upon it and interventions are geared towards altering these physiological responses. The subjects were informed that this training program conceptualized stress according to the third view. Proponents of this view state that stress is a result of an interaction between the body's physical reactions and the demands placed upon it. Interventions within this framework are designed to alter both the individual's physiological responses and the environment. The subjects were given the definitions of stessors and transitory and chronic stress, and were informed about the variables that may effect the stress reaction. The stress reaction was defined as having three distinct components (cognitive, behavioural, and physiological) that tend to occur as an integrated response. It was further explained that although everyone reacts to stress in a general way, everyone has a personal pattern of conditioned responses.

The subjects were then introduced to the theory of relaxation training. The goal of the training was identified as being twofold: to be able to use the relaxation response whenever and wherever needed; and to be able to identify those situations that were generating the stress response. The history and the techniques involved in the relaxation exercises were explained.

Pre-exercise instructions were given and subjects were run through the exercise to ensure they understood the instructions. They were then taught to take their pulse and respirations and to practice this until they could demonstrate proficiency to the researcher. The researcher simultaneously checked their counts to ensure accuracy. The subjects were then asked to make themselves comfortable and the researcher led them through a formal relaxation session (see Appendix G for script).

After the relaxation practice the session was summarized and final questions were answered. The subjects were then assigned homework. They were asked to practice relaxing with side one of their relaxation tape at least once everyday and to moniton their pulse and respirations before and after each practice session and record the responses on the sheets provided.

Session Two

The second session began with a review of the subjects' home practice and the answering of any questions or concerns. The concepts introduced in the last session were also briefly reviewed. The subjects were then introduced to the practice of keeping a stress log (see Appendix H). They were informed that in order to be able to utilize relaxation techniques effectively it is important to be able to recognize not only the stress

response but also the stressors that are triggering it. The stress log was described as a tool that would help them identify these two components. They were instructed in how to use this log and asked to write down the information at the time of the stressful event.

The subjects were then led through the relaxation exercise. After this the session was summarized and homework was assigned. They were asked to continue their daily relaxation practice and to complete their stress log as faithfully as they could. The subjects were also asked to review their stress log prior to the next session and see if there was any consistency in the types of stressors and/or physical stress reactions.

Session Three

In the third session the subjects' relaxation practice and homework was reviewed. The concept of the stress log was also reviewed and the results of their stress log discussed. The subjects were then introduced to the idea of cue-controlled relaxation (Barrios & Shigetomi, 1979). It was explained that this technique is a way of training the body to become relaxed in response to a self-produced instruction or cue. Their cue was the two four count breath built into the relaxation exercise (Appendix G). The theory behind this concept was explained and they were then told that they would be given

step by step instructions on how to introduce this technique slowly into everyday life. They were told that once they had learned this technique they would be able to use it for "mini-relaxations" throughout the day and as a method for helping them to relax during and after stressful events.

The subjects were then led through the relaxation exercise. However, at the end of the exercise they were led in and out of the relaxed state three more times with the relaxation cue. After this, homework was assigned. They were asked to practice the relaxation exercise daily but also to practice relaxing with their cue at the end of the ~~each~~ relaxation session and in nonstressful situations. As well as this they were asked to continue keeping their stress log.

Session Four

As usual, session four began with the collection of the self-monitoring forms and a review of their home practice. The subjects were then introduced to the first step in shortening their stress log monitoring. They were asked to still stop and think about the stressful situations as they occurred. However, instead of writing them down as they happened, they were asked to write them down at mealtimes and at the end of the day. It was explained that the purpose of this training was to teach

them how to monitor their stress responses mentally.

The subjects were then introduced to the short version of the relaxation exercise (Appendix I). It was explained that this version of the relaxation exercise relied mostly on them being able to recall what each muscle group felt like when it was relaxed. They were informed that this technique would allow them to have shorter relaxation practice sessions, as well as provide them with another relaxation tool to use in real life situations. The procedures involved in this technique were explained and then briefly practiced to ensure that the instructions were understood. Following these instructions a relaxation session was held using this shortened technique. Practice of the relaxation cue was included at the end of this session.

After this the session was summarized and any questions answered. For homework, the subjects were asked to use the stress log format described in this session, and to continue with the practice relaxation sessions. However, they were also asked to alternate these sessions between the long version and the short version. They were asked to practice taking themselves in and out of relaxation with their cue at the end of both versions. They were also reminded to practice using their cue invivo in mildly stressful situations.

Session Five

In the fifth session the subjects reviewed their home practice and discussed the data from their stress logs. They were then instructed in the next step involved in monitoring their stress. The subjects were told that since they were well practiced in the formal method of stress logs, they could now move onto a more informal method. They were asked to stop and consider the following questions when confronted with the first physical indicators of stress: what is it about the situation that is stressful?; can the situation be changed?; if not, then what technique should they insitute to change their reaction to it? They were also asked to periodically scan their bodies for indicators of tension that they may be ignoring. They were asked to do this at mealtimes and then take five minutes at the end of a day to review the stressful times that they had noted mentally and to write them down in their logs.

After this the subjects were introduced to the concept of differential relaxation (Hiebert, 1980; Walker, 1975). It was explained that the procedure involved the periodic identification of tension during an activity and the relaxation of nonessential muscles. The subjects were told that the goal of differential relaxation is to induce relaxation in muscles that are not required for the activity, and to eliminate excess tension from those

muscles necessary for the activity. The subjects were asked to practice the technique, given instruction on how to slowly introduce it into everyday life and then received a handout on the steps involved in this implementation (Appendix J).

The session concluded with the practice of the differential relaxation technique in a variety of positions. Subjects were asked to use their relaxation cue and to then scan their body for tension and relax the non-essential muscles and reduce the tension in the essential muscles.

For homework they were asked to use their stress log as instructed in this session, to continue with the relaxation practice, but this time to alternate between using the tape and doing it tape free, and to practice the differential relaxation for five minutes four times a day according to the instruction sheet. They were asked to start using their relaxation cue in moderately stressful situations.

Session Six

The sixth and final session of the training began with a review of the home practice. The complete course content was then reviewed. This was followed by a summary of the main principles involved in the training. It was emphasized that relaxation was a learned skill and that

like all skills proficiency would decrease if it was not used. Practice was therefore still essential if the techniques were to maintain their effectiveness. They were told that if they noticed their proficiency declining in any of the techniques they would have to go back and practice the original steps once again until their skills returned.

After this review they were led through a relaxation training session that included the shortened version of the relaxation exercise, cue-controlled relaxation, and differential relaxation. Subjects were also asked to measure their respiration and heart rates pre and post relaxation practice. Their measurements were checked by the researcher to ensure accuracy. The session was then summarized, questions were answered, and appointments were set up for the next four weeks.

At the end of the six week training the subjects met with the researcher for the paper and pencil testing and with the participating rheumatologist for the dolorimeter measurements. They then met with the researcher weekly for the next four weeks to hand in their self-monitoring booklets. Any questions about the relaxation training were answered at these times. However, no new information or instructions were given. At the end of the four weeks the subjects were once again administered the same tests

by the researcher and the rheumatologist. The subjects were informed that if they wished they could see the results of the study once they were compiled.

CHAPTER 4

DATA ANALYSIS AND CONCLUSIONS

Three types of data were collected from the subjects in this study: paper and pencil measures (STAI-S, STAI-T, AIMS, BECK, and MPQ); dolorimeter readings; and self-monitored measures (daily pain ratings, nightly sleep patterns, medication intake, and physiological responses to relaxation practice sessions: respiration rate and heart rate). The research hypotheses, the analysis of the data, and conclusions are presented in this chapter. Each hypothesis is listed individually and is followed by the results and conclusions relevant to that hypothesis.

Missing Data

Missing data occured in the self-monitoring of pain and sleep patterns. One subject missed 2 nights of sleep monitoring (not consecutive nights) and another subject missed monitoring 3 nights of sleep (not consecutive nights) and 1 day of pain. In accounting for the missing data from these self monitoring sheets means for the week were acheived by calculating the average of only those days that were reported.

Hypotheses

Hypotheses #1

Subjects receiving stress reduction training will experience a reduction in tender point sensitivity, as measured by a dolorimeter.

Results. Dolorimeter readings were taken on 16 tender points. Data from the dolorimeter readings were charted for comparison (see Tables 6-7). There was no consistency in the readings with any of the three subjects. The scores of each subject varied across the study in such a manner that distinct patterns were difficult, if not impossible, to detect.

Conclusions. There was no evidence supporting the hypothesis that stress reduction training reduced tender point sensitivity.

Table 5

Dolorimeter Readings of 16 Tender Points

Subject 01

Tender Point	Enter Study	Begin Treatment	End Treatment	Post Study
Right Side				
Paracervical	5.00	1.00	6.00	5.50
Trapezius	12.00	10.00	6.00	18.00
Supraspinatus Origin	15.00	9.00	22.00	20.00
2nd Costochodral Junction	6.50	9.00	7.50	5.00
Lateral Epicondyles	8.50	9.00	5.00	7.00
Paralumbar	12.00	14.00	9.00	13.00
Buttocks	13.00	11.00	22.00	10.00
Medial Knees	6.00	7.50	7.00	3.00
Left Side				
Paracervical	8.00	7.00	4.00	10.00
Trapezius	10.00	11.00	7.00	10.00
Supraspinatus Origins	10.00	14.00	12.50	8.00
2nd Costochondral	7.00	8.00	6.50	5.00
Lateral Epicondyles	6.00	7.00	5.00	10.00
Paralumbar	14.60	16.00	16.00	13.00
Buttocks	7.00	5.50	13.00	9.00
Medial Knees	7.00	9.00	4.00	8.00

Table 6

Dolorimeter Readings of 16 Tender Points

Subject 02

Week	Enter Study	Begin Treatment	End Treatment	Post Study
Right Side				
Paracervical	12.00	10.00	11.50	13.50
Trapezius	18.50	11.50	14.50	16.00
Supraspinatus Origins	22.00	22.00	16.50	22.00
2nd Costochondral Junction	15.00	10.00	13.50	10.00
Lateral Epicondyles	10.00	15.00	13.50	10.00
Paralumbar	11.00	22.00	11.00	18.50
Buttocks	19.00	14.00	17.50	20.50
Medial Knees	17.00	14.50	14.50	16.00
Left Side				
Paracervical	12.00	13.00	8.00	13.00
Trapezius	16.50	17.00	14.50	14.50
Supraspinatus Origins	20.00	17.50	13.00	22.00
2nd Costochondral Junction	11.00	10.00	6.5	6.50
Lateral Epicondyles	12.00	16.50	9.00	22.00
Paralumbar	13.50	12.00	22.00	17.50
Buttocks	13.50	17.50	19.00	15.00
Medial Knees	18.00	14.00	10.50	13.00

Table 7

Dolorimeter Readings On 16 Tender Points

Subject 03

Week	Enter Study	Begin Treatment	End Treatment	Post Study
Right Side				
Paracervical	11.00	13.50	8.00	9.00
Trapezius	22.00	18.00	14.50	14.00
Supraspinatus Origins	16.00	11.00	15.00	13.50
2nd Costochondral Junction	9.50	8.00	6.00	5.50
Lateral Epicondyles	9.00	4.00	4.00	4.50
Paralumbar	7.00	13.00	7.00	8.50
Buttocks	19.00	18.00	9.00	9.00
Medial Knees	5.00	6.00	7.50	7.00
Left Side				
Paralumbar	7.50	12.50	8.50	7.50
Trapezius	22.00	20.50	16.00	15.00
Supraspinatu Origins	12.00	14.00	4.50	6.00
2nd Costochondral Junction	7.00	9.00	5.50	6.00
Lateral Epicondyles	17.50	10.50	8.00	7.00
Paralumbar	12.00	15.00	7.50	7.00
Buttocks	22.00	22.00	9.00	10.00
Medial Knees	17.50	9.00	7.00	7.50

Hypothesis #2

Subjects receiving stress reduction training will experience a decrement in the subjective experience of pain as evidenced by end of treatment and post treatment scores on the MPQ, AIMS, and self monitoring pain charts.

Results. The data from the MPQ were analysed by calculating the pain rating index based on the subjects' mean scale values (PRI-S), the pain rating index based on the rank values of the words (PRI-R), the number of words chosen (NWC), and the present pain intensity (PPI). For each of these categories the data was divided into sensory, affective, and evaluative words. The results were charted for each subject for comparison (see Tables 8-10). For subject 01 there was little change across the length of the the study on any of the scores. There was a slight increase in the sensory class in each of the indexes at the end of treatment, but these decreased to previous levels at post treatment testing. Subject 01 also experienced a slight decrease in her PPI score at the beginning of treatment, although this did not reflect itself in any other scores at that time. The PPI score returned to its initial level at end of treatment (see Table 8). Subject 02 experienced little change in any of the scores during the study. There was a slight decrease in the PPI at the end of treatment, but this returned to

previous levels at the post treatment testing. The scores with this subject were low to begin with and therefore these slight changes are likely to be an unreliable indicator of any actual change.

Table 8

MPQ Scores

Subject 01

Measure	Enter Study	Begin Study	End Study	Post Study
PRI-S				
sensory	1.70	1.70	2.25	1.33
affective	2.00	0.00	2.00	2.00
evaluative	0.00	0.00	0.00	0.00
TOTAL	1.75	1.70	2.20	1.50
PRI-R				
sensory	6	4	11	3
affective	1	0	1	1
evaluative	0	0	0	0
TOTAL	7	4	17	4
NWC				
sensory	3	3	5	3
affective	1	0	1	1
evaluative	0	0	0	0
TOTAL	4	3	6	4
PPI	2	1	2	2

Table 9
MPQ Scores
Subject 02

Measures	Enter Study	Begin Study	End Study	Post Study
PRI-S				
sensory	1.8	1.83	1.67	2.12
affective	0.00	2.00	2.50	2.50
evaluative	2.00	3.00	2.00	2.00
TOTAL	1.83	2.00	1.89	2.18
PRI-R				
sensory	14	16	14	21
affective	0	1	2	3
evaluative	2	4	3	3
TOTAL	16	21	19	27
NWC				
sensory	5	6	6	8
affective	0	1	2	2
evaluative	1	1	1	1
TOTAL	6	8	9	11
PPI	3	3	2	3

Table 10

MPQ Scores
Subject 03

Measures	Enter Study	Begin Study	End Study	Post Study
PRI-S				
sensory	2.00	2.00	1.80	2.00
affective	2.00	2.00	2.00	1.00
evaluative	2.00	0.00	0.00	0.00
TOTAL	2.00	2.00	1.83	1.80
PRI-R				
sensory	18	12	15	14
affective	3	1	1	1
evaluative	3	0	0	0
TOTAL	24	13	16	15
NWC				
sensory	7	4	5	4
affective	2	1	1	1
evaluative	1	0	0	0
TOTAL	10	5	6	5
PPI	3	2	3	2

This subject also experienced a slight increase in the sensory class across all indexes at the post treatment stage (see Table 9). Subject 03 experienced a decrease in PRI-R, NWC, and PPI scores from entry to the beginning of treatment. However, there was no real change once treatment began. In fact her PPI score returned to the entry score level at the end of treatment, although decreased again at post-treatment (see Table 10). All subjects scored the highest on the sensory class across indexes and the lowest on the evaluative class. Overall there was no indication that any of the subjects experienced a decrease in the levels of pain after treatment.

The scales of the AIMS that were used in this portion of the study were mobility (M), physical activity (PA), dexterity (DX), household activities (HA), social activity (SA), activities of daily living (ADL), and pain (P), The scores were charted for comparison (see Table 11). The scales are scored in such a way that a low score indicates a high health status. Subject 01 showed a decrease in the PA, DX and P scales across treatment. There were no significant changes in any of the other scales. Subject 02 showed an increase in the PA, HA, SA, and P scores at the post-treatment testing. Subject 03 showed no significant change in the PA, DX, HA, SA, and

ADL scores. There was a significant decrease in the M score as well as a slight decrease in the P score from study entry testing.

Table 11

AIMS Normalized Scores For All Three Subjects

Time	M	PA	DX	HA	SA	ADL	P
Subject 01							
Enter	2.5	8.0	8.0	.77	3.5	0	7.0
Begin	0	4.0	8.0	.77	4.0	0	5.5
End	0	6.0	6.0	.77	3.5	0	5.0
Post	1.25	6.0	4.0	.77	2.5	0	4.5
Subject 02							
Enter	0	4.0	2.0	.77	4.0	0	5.5
Begin	0	4.0	2.0	.77	4.0	0	5.5
End	0	4.0	2.0	0	4.0	0	5.5
Post	0	6.0	2.0	2.3	5.0	0	6.5
Subject 03							
Enter	2.5	8.0	2.0	6.77	3.0	0	7.5
Begin	0	8.0	0	.77	2.0	0	5.5
End	0	8.0	2.0	.77	3.5	0	5.0
Post	0	8.0	2.0	.77	2.5	0	5.0

Pain charts were collected weekly and the data was graphed using daily means and ranges. Weekly means were then calculated and graphed (see Figure 1). Subject 01 showed a reduction in pain in week nine. The level began to rise again by week 11 and remained at pre-treatment levels. Subject 02 demonstrated a steady decrease in pain from the beginning of treatment except for week 12. Her level decreased after that and remained

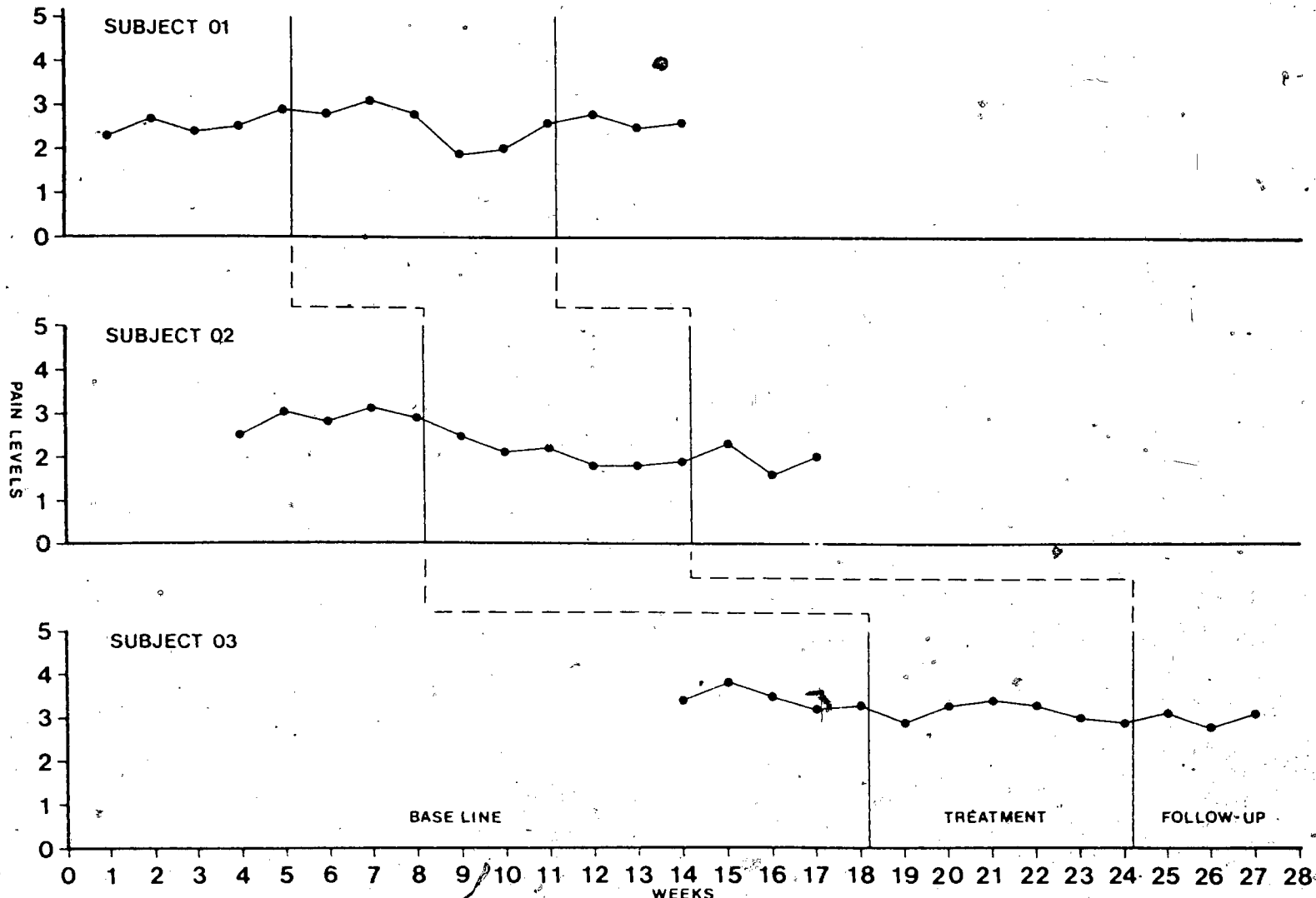

Figure 1. WEEKLY PAIN MEANS

below pre-treatment levels. This data is in contrast to her scores on the MPQ and the AIMS. Subject 03 demonstrated a slight and sustained decrease in pain from pre-trearment levels. No distinct pattern could be detected when all three subjects levels were graphed to gether (see Figure 1).

Subjects monitored their analgesic medication intake daily. Subject 02 took no pain medication during the course of the study. Subject 02 maintained her regularly prescribed medication with no alteration during the study. Subject 03 took p.r.n. (take as needed) medication on a regular basis and there was no alteration in the amount or type of this medication during the study.

Conclusions. There is no data to support the hypothesis that stress reduction training reduces the subjective experience of pain in fibrositis. Although some pain reduction is evident in all three subjects self-monitoring charts at some point in the treatment it cannot be clearly attributed to stress reduction training. It is important to note that although subject 02 demonstrated a clear reduction in pain according to her self-monitoring charts, this is not supported by her scores on the MPQ, AIMS, or by her analgesic medication

intake. Possible explainations for this are discussed in the next chapter.

Hypothesis #3

Subjects receiving stress reduction training will experience a reduction in their levels of anxiety and depression as evidenced by score comparisons on measures of anxiety and depression.

Results. Depression levels were measured by the Beck Depression Inventory and the depression scale of the AIMS. Data was charted for comparison (see Tables 12-13). Subject 01 showed an increase in her depression level on the AIMS from when she entered the study to when she began treatment. Her score after this remained relatively stable. This increase did not display itself on the Beck. In fact there was a slight decrease in her Back score from study entry to the beginning of treatment. Subject 02 showed a slight increase in her Beck score from study entry to the beginning of treatment, then a decrease at post-treatment, and an increase once again at post-study testing. The changes were however all fairly slight. Her AIMS score dropped slightly at the end of treatment but returned to previous levels at the post-treatment testing.

There was no change on Subject 03's Beck score across the study and a slight drop in her AIMS score from study entry to the beginning of treatment. This level remained stable throughout the remainder of the study.

Table 12
Beck Depression Inventory Scores
For All Three Subjects

Time	Subject 01	Subject 02	Subject 03
Enter Study	4	3	2
Begin Treatment	3	6	2
End Treatment	3	3	3
Post Study	3	5	2

Table 13
AIMS Depression Scale Scores
For All Three Subjects

Time	Subject 01	Subject 02	Subject 03
Enter Study	1.65	2.45	4.29
Begin Treatment	5.94	2.31	2.31
End treatment	6.27	.99	2.97
Post Study	4.63	2.64	2.45

Anxiety was measured by the STAI-T, STAI-S, and the anxiety scale of the AIMS. Scores were compiled and charted for comparison (see Table 14). Subject 01 showed a slight increase in her STAI-T and her AIMS score at the end of treatment. However, her scores returned to previous levels at the post-study testing. Subject 02 showed a drop in both her STAI-S and her AIMS scores from study entry to the beginning of treatment. Both of these scores rose again at the post-study testing. Subject 03 showed a steady decrease across treament in both her STAI-T and her AIMS scores.

Table 14

STAI-T, STAI-S, and AIMS Anxiety Scale Scores For All Three Subjects

Measure	Time	Subject 01	Subject 02	Subject 03
STAI-T	Enter Study	35	39	48
	Begin Treatment	33	40	43
	End Treatment	36	37	41
	Post Study	33	37	40
STAI-S	Enter Study	24	45	29
	Begin Treatment	26	28	30
	End Treatment	24	37	28
	Post Study	29	49	28
AIMS	Enter Study	2.97	3.75	5.61
	Begin Treatment	2.31	3.63	4.62
	End Treatment	3.96	3.63	3.96
	Post Study	2.64	2.97	3.50

on a scale of 1-10 (1 being very calm, 10 being very

Subjects were also asked to monitor their heart rate before and after every relaxation practice. Weekly averages were calculated on the before, after and difference scores (see Tables 15-17). All three subjects demonstrated an ability to relax with the relaxation exercises. Subject 01 showed no accumulative effect in her ability to relax over the course of treatment by either her heart rate or her respiration rate. Subject 03 showed no accumulative effect on her heart rate and only a slight accumulation effect on her respiration rate. However, subject 02 showed an accumulation effect on both her heart rate and her respiration rate from the third week of treatment on. Subject 01 showed a slight decrease in her after practice tension levels from the third week of treatment on but the difference scores show no accumulative effect. Subject 02 showed a marked decrease in her before practice tension ratings from the third week of of treatment on. This appears to indicate that an accumulation effect did occur. However there was no accumulation effect in her difference scores across treatment. This however may be the result of her low before practice scores. Subject 03 showed no particular pattern in her tension scores. Although she seems to have been able to relax with the exercises, there appears to have been no accumulative effect across treatment.

Table 15

Tension State Mean Scores

For All Three Subjects

Week Score	Before Practice	After Practice	Difference
Subject 01			
1	2.90	1.80	1.00
2	2.58	1.16	1.42
3	3.14	1.43	1.71
4	2.31	1.38	0.93
5	2.28	1.20	1.12
6	2.43	1.18	1.00
Subject 02			
1	6.20	3.40	2.80
2	2.29	0.57	1.71
3	4.43	1.57	2.86
4	3.25	0.88	2.38
5	2.83	0.33	2.50
6	2.25	0.42	2.34
Subject 03			
1	4.14	1.86	2.28
2	3.14	1.43	1.71
3	3.29	1.29	2.00
4	2.67	1.33	1.33
5	3.29	1.57	1.71
6	2.71	1.14	1.57

Table 16

Heart Rate Mean Scores

For All Three Subjects

Week	Before Practice	After Practice	Difference
Subject 01			
1	68.80	62.60	6.40
2	68.50	62.66	5.83
3	72.85	63.71	9.14
4	67.38	63.38	4.00
5	68.50	62.70	5.80
6	71.36	63.50	7.86
Subject 02			
1	82.20	74.60	7.60
2	82.28	73.43	8.85
3	82.57	74.86	7.71
4	84.00	73.00	11.00
5	86.00	72.33	13.67
6	86.50	71.62	14.88
Subject 03			
1	75.14	62.29	12.85
2	71.14	64.29	6.85
3	72.29	63.71	8.57
4	72.00	66.33	5.67
5	75.14	64.29	10.86
6	74.57	66.86	7.71

Table 17

Respiration Rate Mean Scores
For All Three Subjects

Week	Before Practice	After Practice	Difference
Subject 01			
1	12.30	10.80	1.50
2	10.83	9.00	1.83
3	11.00	8.71	2.29
4	10.62	9.38	1.24
5	10.60	9.06	1.54
6	10.80	9.01	1.79
Subject 02			
1	16.00	13.00	3.00
2	16.00	12.00	4.00
3	16.29	14.29	2.00
4	15.75	12.75	3.00
5	16.00	12.00	4.00
6	16.50	12.00	4.50
Subject 03			
1	15.86	11.71	4.15
2	14.57	11.00	3.57
3	14.57	10.00	4.57
4	14.00	9.00	5.00
5	16.71	11.86	4.86
6	15.29	10.00	5.29

Conclusions. There is no data to suggest that stress reduction training markedly reduced the levels of anxiety and depression in any of the three subjects. It should be noted however, that subjects with moderate and higher levels of depression had been screened out of the study. Therefore dramatic decreases in depression levels could not be expected. Also, subjects displayed normal anxiety levels at the beginning of the study. Once again it is therefore not suprising that anxiety measures were unaffected by the stress management training. The self-monitored data from the relaxation practice sessions demonstrates that the subjects were able to relax at these times.

Hypothesis #4

Subjects receiving stress reduction training will experience an increase in the total amount of sleep obtained per night as measured by their self monitoring booklets.

Results. Subjects monitored their sleep patterns (continuous and interrupted sleep) nightly from the time they went to bed until the time they got up for the day. The data was charted on daily graphs and then weekly means were calculated for continous and interrupted sleep, and

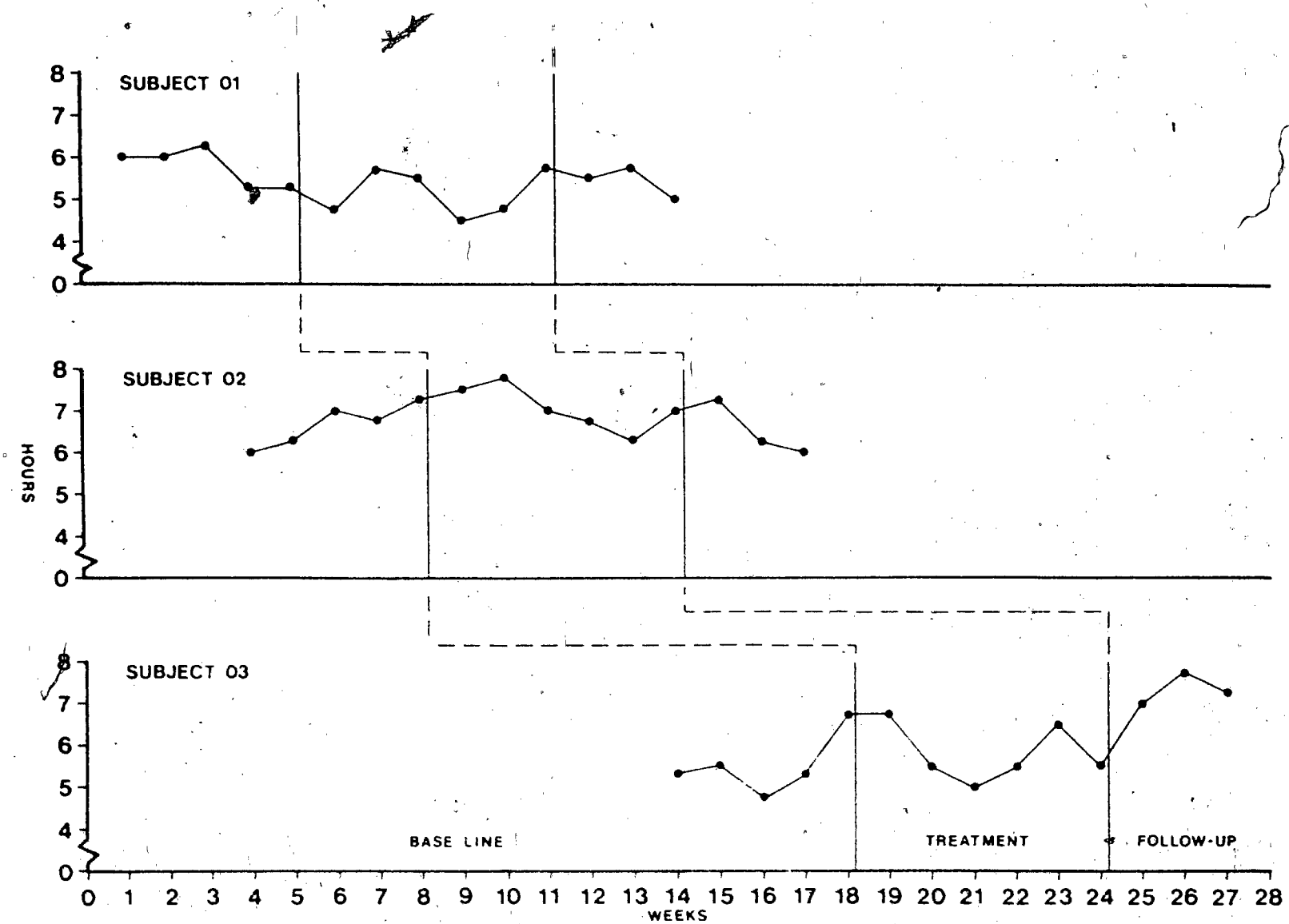

Figure 2. WEEKLY CONTINUOUS SLEEP MEANS

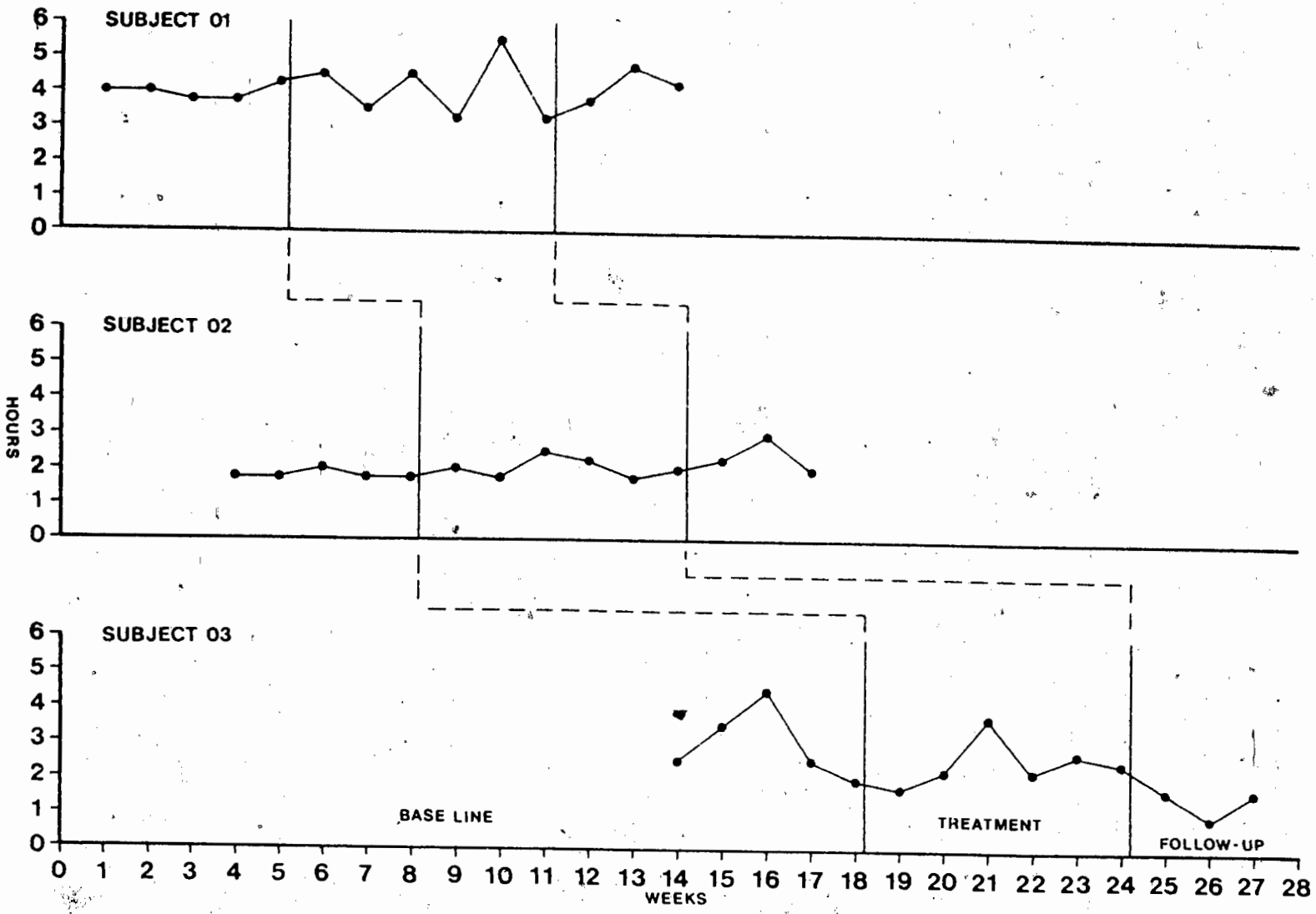

Figure 3. WEEKLY INTERRUPTED SLEEP MEANS

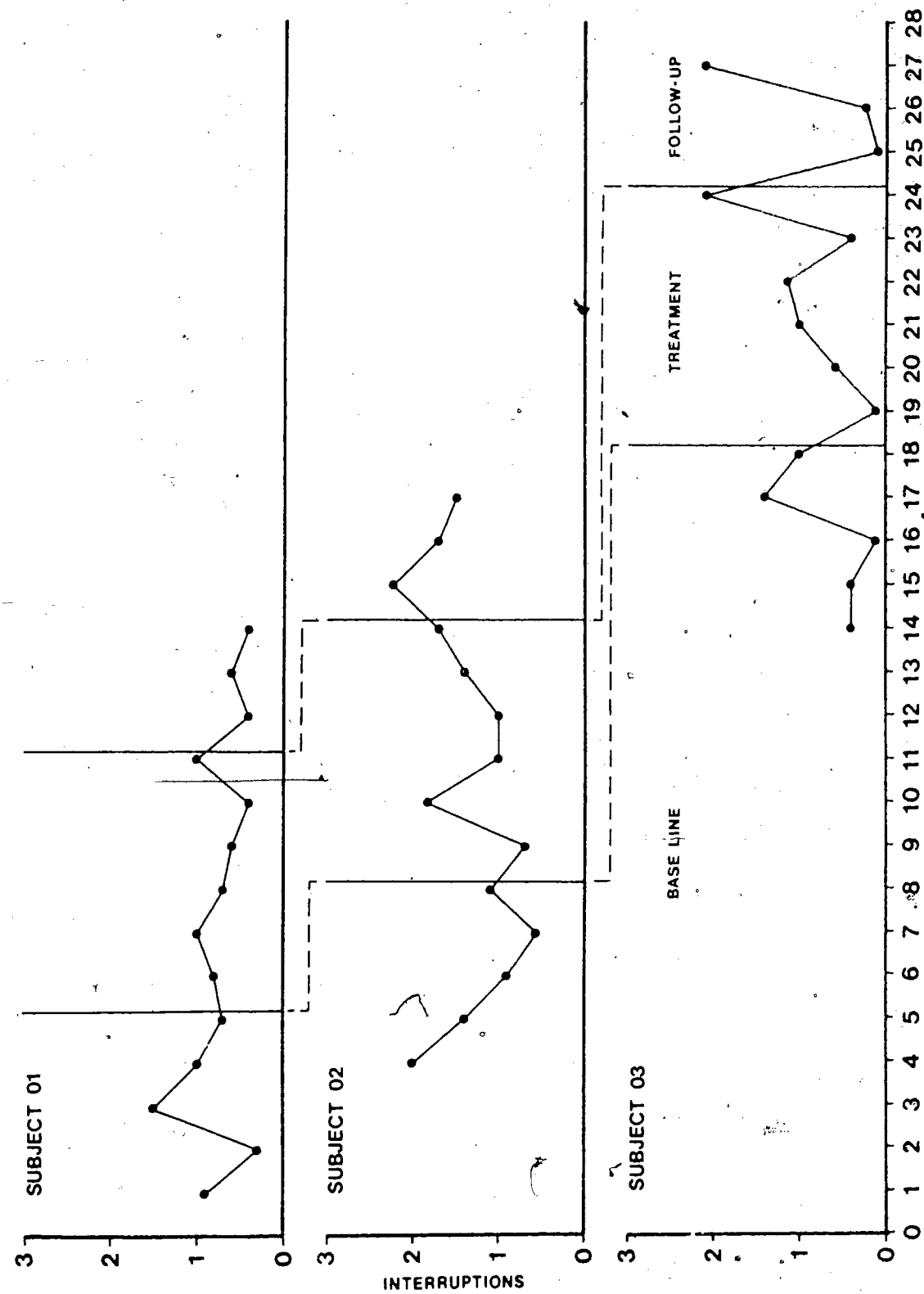

Figure 4. WEEKLY NUMBER OF INTERRUPTION MEANS

number of interruptions (see figures 2-4). The number of interruptions obviously does not correlate necessarily with the number of hours of interrupted sleep. Subject 01 showed a pattern of difficulty getting to sleep, a low number of interruptions once asleep, and occasionally long periods of wakefulenss once interrupted. This pattern did not change significantly throughout the course of the study. Subject 02 demonstrated a pattern of either having no difficulty falling asleep but having a higher number of interruptions throughout the night, or of having difficulty falling asleep but having few interruptions following. This pattern did not change significantly during the study. Subject 03 demonstrated difficulty with falling asleep and waking up early. Her interruptions were usually of a short duration once asleep. Her total number of hours of continuous sleep rose slightly post treatment, and concomitantly, her total number of hours of interrupted sleep decreased. However, since there is no firm descernable pattern over the course of treatment, this rise cannot be attributed to the treatment.

Subjects also monitored their sedation medication intake. Subject 01 took minimal amounts of a hypnotic medication periodicaly with no discernable pattern or change during the study. Subject 02 regularly took a minor tranquilizer for sleep, and did not change this

pattern during the study. Subject 03 also took a regular minor tranquilizer for sleep, and continued to do so throughout the study.

Conclusions. There is no data to support the hypothesis that stress reduction training affected the sleep integrity of the subjects in this study.

Subjective Reports

Throughout the study there were consistent statements made by all three subjects. These statements have a bearing on the results of the study. These will be discussed under the following headings: effect of the treatment; monitoring of physical symptoms; validation of phenomena; and pacing.

Effect of The Treatment

All three subjects commented on the fact that they enjoyed the relaxation exercises and found them helpfull. There was a section on the relaxation monitoring forms for comments. Subjects were directed to use this section for keeping track of any difficulties they had or how they perceived that that particular training session had gone. No other guidelines were given. Comments included statements such as, "Had best day I've had for a long time. Starting to realize how very tense I really am.", "I wish I had this a long time ago.", "Helpfull - always

enjoy.", and "Pain made relaxing difficult, but it always does good". These same kind of statements were made to the researcher in the training sessions. At each of the testing points the subjects would meet with the participating physician for approximately five minutes to have their tender points measured by the dolorimeter. At these times, on the doctors enquiry, they would each state that they were not any better and indicated that they were not finding the treatment very helpfull. No comments were made on this discrepancy by the researcher in order not to influence the subjects at future meetings.

Monitoring of Physical Symptoms

All three subjects expressed difficulty in monitoring their pain levels and physical indicators of stress. There was general agreement that they had attempted to cope with their pain by trying to ignore it. This coping technique appeared to have generalized so that they attempted to ignore all physical symptoms, whether they were pain related or not. It was difficult for all three subjects to identify when they were feeling stressed or what their particular physical indicators of stress were. As a result all three subjects had problems instituting the relaxation techniques at the lower end of the stress reaction scale, as well as the pain scale. All three subjects indicated that they found the relaxation

techniques helpful for pain levels 2 and 3 but not for pain levels 4 and 5.

Validation of Phenomena

All three subjects commented on the fact that they were very relieved at having their symptoms and experiences validated. All three subjects had been experiencing their symptoms for more than five years without obtaining a satisfactory explanation from their physicians. Two of the subjects had received more than one other diagnosis for their symptomatology. As is often the case with patients with fibrositis, some of their previous physicians had intimated that the cause of their distress was psychsomatic All three subjects stated that they themselves were beginning to wonder if this was the case due to lack of overt pathology, variability of symptoms, and physician feedback. They also expressed appreciation for the researchers time, the acknowledgment of their pain levels, and the understanding of the problems that accompany the chronic pain experience. They stated that these needs had not been usually met by their physicians. In fact they all expressed the concern that their physicians were frustrated with them because they were not benefitting from treatment and appeared to prefer to see them for as short a time as possible. Whether this was the case or just the subjects assessment of the situation was not investigated by the researcher.

Pacing

All three subjects had difficulty pacing their physical activities in relation to their pain levels. If they had lower pain levels for a day or more they would tend to exert themselves physically (e.g., clean the whole house, weed the garden, etc.). This would result in their pain levels rising the next or following day. In all subjects these elevated pain levels would continue for two or three days. They offered two explanations for this behaviour. First, they felt that if they did not do this work when they were feeling better then it would not get completed. Second, they expressed feeling a certain amount of guilt concerning their decreased functional abilities. They did not want to appear as if they were using their physical condition to avoid activities that they were previously responsible for. Therefore, they would try to make up for the time they had lost because of pain and attempt to complete everything in one go.

All three subjects also experienced some difficulty in pacing their activities with friends and relatives. For example, one subject lived in a male dominant household. Her role was to cook and clean up after all meals, and maintain the house and the garden. She found it difficult to ask for help or to not complete a task if she felt in a lot of pain. Consequently she tended to overexert herself which sometimes resulted in an increase

in pain. Another subject went away with some friends for the week-end. When they decided to go for a long hike she went along despite being in a lot of pain. She felt if she refused the rest of the group, in order not to make her feel left out, may not have gone. Consequently, this subject had to remain in bed the next day because of high pain levels. These are two examples of the type of behaviour pattern exhibited by all three subjects. Whether this behaviour was the result of poor assertiveness skills or some other factor was not investigated by the researcher.

Conclusions. The above data suggests that a number of variables may have been confounding the results of the study. Although this data was derived from subjective reports it is important to consider the implications to overall study outcomes and future treatment and research plans.

Discussion of these results, their implications, and some direction for future research in this area are discussed in Chapter V.

CHAPTER 5

IMPLICATIONS AND FUTURE DIRECTIONS

Various studies have postulated that excessive stress exacerbates the symptoms of fibrositis and that stress management training may be a effective treatment intervention (Smythe, 1979; Yunus, Masi, Calabro, Miller & Feigenbaum, 1981). This study attempted to address this issue by investigating the effects of a 6 week stress management training program on the following symptoms of fibrositis: tender point sensitivity, the subjective experience of pain, and sleep integrity. The subjects' levels of anxiety and depression were also monitored. In this chapter, a summary of the results, limitations of the study, strengths of the study, and directions for future research are discussed.

Summary of Results

Three types of data were used in this study: self-report measures of pain, anxiety, and depression; dolorimeter readings of tender point sensitivity; and self-monitored data of pain levels, sleep, medication intake, and physiological responses to relaxation practice sessions.

Support For Treatment

All three subjects demonstrated an ability to relax

with the relaxation exercises during the practice sessions. This was demonstrated by a consistent change in all three subjects pre- and postpractice measures of heart amd respiration rates and tension levels. However, only one subject showed an accumulation effect across treatment in both her physiological responses and in her tension ratings, indicating an increased ability to relax across treatment.

All of the subjects learned to identify some of their stressors as well as some of their physiological indicators of stress. This was evident from the data recorded in the stress logs that they each kept. They found that by applying the stress management techniques in stressful situations they were able to lower the level of their stress reaction and/or return to pre-stress levels more quickly. However, none of the subjects were able to apply these techniques consistently to all identified stressors. They also continued to display difficulty with recognizing early indicators of physical stress and lower pain levels.

All three subjects commented on the fact that they enjoyed the training program and had found it helpful for a number of reasons. First, they felt that the relaxation exercises, especially the practice sessions, made them feel more relaxed. In fact they all made the

statement that they looked foreward to the practice sessions and viewed them as a "special" time just for themselves. Second, they felt that they were able to handle some life situations more easily by applying the stress management techniques in vivo. Third, all three subjects stated that by the end of the training program they were better able to pace their activities according to their daily functional levels. Fourth, all of the subjects stated that they were able to use the techniques they had learned as a pain control method. However, these techniques were only effective for pain levels of 2-3, and not 4-5.

Overall, the subjects felt that the training program had taught them how to "slow down" and to not feel responsible for immediately meeting all the demands that they and others placed upon them. These factors appeared to allow them to feel more in control of themselves and their environment.

Results

There was no evidence to suggest that the stress management training program reduced tender point sensitivity, medication intake or that it improved sleep integrity. None of the self report measures indicated any reduction in the subjective experience of pain for any of the subjects. However, the self-monitored data

indicates that Subject 02 did have a steady decrease in pain levels across treatment.

There was also no marked reduction in any of the subjects levels of anxiety or depression. However, highly depressed subjects were not accepted into the study. Since the subjects' pretreatment depression levels were low and their anxiety levels were moderate to begin with no change in these levels during treatment could have been expected.

The subjects did display an ability to relax in the relaxation practice sessions, but did not seem to be able to consistently generalize this skill in-vivo, especially in the area of pain management. One explanation for this lack of generalization may be because of the difficulties that they had with the training program. These difficulties were consistent across subjects. All subjects demonstrated problems with learning to recognize their physiological indicators of stress and lower pain levels, and in pacing their activities in accordance with their changing functional levels. The exercises in the training program aimed at teaching these techniques appeared to be counterintuitive to their normal coping patterns. These patterns included ignoring physical symptoms, overexerting themselves when they were feeling better and overcompensatory behaviour that seemed to stem

from the fear of being seen as a malingerer. The consistency of these difficulties across subjects indicates that a number of variables were effecting the results of the training program. These variables are discussed in detail in the next section.

Limitations

The data from this study has allowed for the identification of a number of limitations in this training program. These limitations have direct implications for future treatment and research.

Definition of Treatment Success

Hersen and Barlow (1976) point out that one of the difficulties in group comparison research designs is that statistical significance may not mean clinical significance. Single-case designs tend to avoid this type of problem as they focus on an individual subject's data and usually assess treatment results based on clinical significance. However, since pain is a subjective experience it may be important to obtain from the subjects at the beginning of treatment what level of pain reduction needs to be reached before they would consider the treatment to have been effective. Unless the patient evaluates the treatment as effective, the

techniques learned will most likely not continue to be used and the patient will not have ultimately benefitted.

One subject in the study demonstrated a slight reduction in pain levels, one demonstrated a period of pain reduction, and one demonstrated an accumulated reduction in pain levels. However, in the self-report tests they all reported no change in their pain experience. It is possible that the subjects in the study may have only considered the treatment to have been effective if either they were experiencing no pain, long periods without pain, or a general level of minimal pain. Without identifying clearly at the begining of the study the subjects' success criteria the researcher is once again placed in the position of defining outcome significance.

One possible method of defining criteria for treatment success is Goal Attainment Scaling (GAS). This program evaluation system was orginally designed for community mental health programs by Kiresuk and Sherman (1968). GAS is a scaling technique that utilizes single-subject design. Each subject rates various possible treatment outcomes on a 5-point scale. The outcomes are defined in clear, measurable behavioural terms, and focus on the specifc problems and goals for each individual client (Bartlett & Colon, 1982). The

treatment outcome that the patient expects to most likely occur is rated as 0 and this acts as the midpoint of the scale. The upper portion of the scale represents further improvement so that +1 equals a more favourable treatment outcome and +2 equals the most favourable outcome possible. The lower portion of the scale represents deterioration in the same manner: -1 equals a less favourable outcome and -2 equals the least favourable outcome possible. Each behaviour targeted for treatment can be weighted for importance by the client. For example, a client may consider a decrease in his or her pain level to be more of a treatment priority than a decrease in anxiety.

Through this type of process GAS can be used to measure short-term therapeutic goals or ongoing treatment (Kratcoski, 1982). GAS ensures that the patient and the therapist are talking the same language when assessing treatment outcome.

Symptom Undulation

At the moment there is no consensus on the natural history of fibrositis. Currently the literature indicates that the symptoms probably vary up and down in intensity and that there is no progressive deterioration (Smythe, 1981). This study attempted to compensate for this uncertainty by obtaining lengthy baselines pre- and

posttreatment and staggering treatment onset across subjects. Any cyclical variation as opposed to treatment effect should therefore have been evident.

Multi-Component Treatment Approach

In this study stress is conceptualized from an interactional perspective. According to this model stress is defined as an individual's response to a situation that exceeds the person's perceived coping abilities (Cox, 1978; Hiebert, 1983; Kasl, 1984). The stress response has three components: physiological, cognitive and behavioural (Lazarus, 1974). These three components tend to occur as an integrated response and a change in one typically leads to a change in the other two (Hiebert, 1983).

It is now well accepted that the perception of pain is a complex phenomena (Melzack & Wall, 1982). It involves an interaction between the same components that make up the stress response: physiological reactions, cognitions, and behaviours (Bond, 1980; Craig, 1983; Melzack & Wall, 1982; Merskey, 1974). Pain can therefore be viewed as a stressor in and of itself that triggers a complex response that may exceed a person's self-perceived coping abilities. As such, an effective intervention package may need to combine techniques that are aimed at all three of the response spheres. This

study mainly focussed on the physiological component of the stress response. The implications of this for future treatment and research are discussed in the final section of this chapter.

Length of Treatment

Chronic pain develops over a long period of time. It therefore allows for the accumulation of well entrenched conditioned responses in the realms of behaviour, cognitions and physiological reactions. The effects of this process were evident in the subjects in this study. All three subjects in this study had been experiencing chronic pain for a number of years. They displayed many of the characteristics common to chronic pain patients such as fear of being seen as a malingerer, discouragement about not being in control of their pain, and concern that physicians would no longer be able to offer them assistance (Bond, 1980; Craig, 1978; Keefe, Brown, Scott & Ziesat, 1982; Melzack & Wall, 1982). The subjects in the study also demonstrated histories and profiles that are typical of fibrositis patients. They had seen numerous doctors and had obtained a variety of different diagnosis, they were concerned that physicians and family thought that their symptoms were psychogenic and had begun to wonder about this themselves (Campbell, Clark, Tindall, Forehand & Bennett, 1983; Smythe, 1981).

They had also developed behaviours that were initially protective but were now destructive to their bodies. This was demonstrated by such behaviours as failing to attend to physical cues of stress or lower pain levels, inability to pace their activities with their daily functional levels and periodically disregarding personal needs for fear of being seen as a malingerer. Consequently all three subjects had developed a number of well entrenched conditioned responses in all three spheres (physiological, cognitive and behavioural).

The treatment in this study lasted 6 weeks. Given all of the above considerations it is probable that the treatment time was too short to enable the subjects to learn alternative coping behaviours and intergrate them into everyday life. It was not possible to pace the treatment to the individual needs of each subject as the treatment protocol was fixed and did not allow for an alteration in approach, as would normally be the case in single-subject design.

At this time it is unknown what the optimum length of such a treatment program for patients with fibrositis is. It is also unknown what the relationship is for patients with fibrositis between onset of treatment and onset of effect; i.e., at what point in treatment should positive effects be expected and is there a posttreatment

cumulative effect if patients keep practicing the techniques.

Nonmedical Treatment Approach

Although the subjects were referred by their rheumatologists, all contacts with the subjects occurred at the Arthritis Society and a physician was involved in the testing of one of the dependent measures, there was no direct medical involvement in treatment. The treatment was based on a nonmedical model. It is possible that this may have had a number of effects.

First, the subjects had all received medical interventions for their symptoms prior to this study. A nonmedical intervention requires patients to make a change in their conceptualization of pain processes and treatment approaches. Patients may therefore require a treatment program that incorporates a more in depth educational component to assist them in making this conceptual transition. This educational component could focus on examining pain not only as a symptom but as a complex, interactional syndrome that requires the knowledge and techniques of different specialties to assist in its control (Roy, 1984). Other topics such as the misperceptions and myths that often accompany fibrositis and the chronic pain experience as a whole could also be examined.

Second, research indicates that chronic pain patients fear being denied further medical help (Bond, 1980). A nonmedical treatment approach could potentially be threatening to patients as they may fear that it indicates that all medical interventions have been exhausted and that no further help will be offered. To reduce the potential negative effect of this variable, it may be important to have a physician reassure the patient that continued medical assistance will be available once the nonmedical treatment is concluded.

Third, it has been documented that fibrositis patients react negatively to any suggestion that they are deliberately malingering, or that their symptoms may be psychosomatic (Smythe, 1981). This behaviour is partly in reaction to the frustration demonstrated by family and physicians at not being able to help, and the often concomitant underlying insinuation that there is really nothing physically wrong (Melzack & Wall, 1982). Stress management training focuses on teaching patients how to limit the amount of self-induced symptom exacerbation. The approach may therefore be threatening as patients may fear that if it is successful significant others may interpret the results as indicating that the symptoms were purely self-induced. One way of reducing this factor may be to have medical involvement in the

educational component of the treatment, and the reassurance of continued medical involvement if necessary after treatment. It is perhaps for these reasons that Merskey (1974) states that a psychologist involved in pain treatment should be part of a physically based team. If not, the referring physician should explain to the patient the rationale for nonmedical treatment.

The above considerations may account for the discrepancy in Subject 2's data. This subject showed a steady reduction in her self-monitored pain levels and yet showed no change in any of the other dependent measures.

Small Number of Subjects

Due to a variety of circumstances this study was conducted using only three subjects. It is possible that these subjects were all idiosyncratic non-responders and that the results have been effected accordingly. Given the small "n" caution must be exercised in generalizing any of the data to the general fibrositis population.

Self-Report Discrepancies

During the study each of the subjects expressed to the researcher that the treatment was helpful, and to the physician that it was not. The reason for this discrepancy may be related to some of the above factors discussed in the section on Nonmedical Treatment

Approach. It could also be due to a number of other factors. First, the subjects may not have wanted to 'hurt' the researcher's feelings and they therefore conveyed what they thought the researcher wanted to hear. Alternately, they may not have wanted to 'hurt' the physician's feelings by indicating that medical treatment had not been as effective. Second, the patients may have been concerned that if they indicated that a nonmedical treatment had been effective, they would be denied further medical help. Third, it may also have been due to the lack of definition of terms. It was never clearly defined in the sessions with the physician what the physician or the patient meant by 'helpful'. Melzack and Wall (1982) have described the difficulties patients have in conveying in words what they are actually experiencing. These difficulties may extend to the term 'helpful' as well. It is conceivable that each party was using a different definition for the term and that the patients were being honest in both cases. Kremer (1983) contends that the content of a patients' disclosure is a function of the age, sex and professional stature of the examinor. Further to this, Kremer also states that patients use self-reports to not only convey pain complaints but also information and requests. It is possible that a number of the above variables were

contributing to the self-report discrepancies found in this study.

Lack of Family Involvement

Research has shown that the reaction of significant others to the patients' behaviour not only effects the behaviour itself but also the patients' pain perception (Block, Kremer & Gaylor, 1980; Fordyce, 1982). Nonmedical treatment interventions lead to behavioural changes in the treatment subject. It is therefore important that significant others not only understand the processes that are involved in chronic pain but that they are also given an understanding of the changes in behaviour that the patient may be making during the course of treatment (Fordyce, 1982). Each of the subjects in this study expressed concern about how their families would react if they made the changes that they had identified as necessary (e.g., refraining from certain activities that they normally had attempted to do). In fact, some changes were either not made or were delayed for long periods because of this. The families of the subjects were not directly involved in this research project and this is now seen to have been a limitation of the study.

Dolorimeter Readings

Chapter three described the difficulties that are

involved in obtaining precise readings of tender point sensitivity with a dolorimeter. Some of these include the problem of ensuring that the readings are taken from exactly the same spot every time, that the same amount of pressure is exerted at each testing and that there is the exact same time lag between the time that the patient says stop and the time that pressure is discontinued. In order to compensate for some of these difficulties it would have been advisable to have taken three consecutive readings at each site during each session and averaged the results into one reading. This would allow for a higher level of confidence in the readings.

Strengths

The design of this study contained a number of strengths that allowed for the identification and subsequent extrapolation of a number of important factors.

Single-Case Design

The fact that the study was based on single-case design ensured that this treatment approach could be investigated within a reasonable time-frame, and without having to have subjects wait an inordinate amount of time before being able to receive treatment. This research method also allowed for the identification of a number of

variables that may not necessarily have surfaced in a group comparison approach, such as difficulty with physiological monitoring and pacing of activities. The multiple-baseline across subjects design also allowed for study replication. Therefore a firmer data base was obtained for generating recommendations for future treatment and research.

Adherence to Treatment Protocol

Each subject received the same information handouts about the study and on fibrositis. Each treatment session adhered to a very detailed treatment protocol. This ensured that each subject received exactly the same information in the same format and order and that any differences in treatment results were not due to differences in information and training.

Self Report Measures

All of the self-report measures used in this study have been previously used in research with either chronic pain patients or patients with fibrositis. This allows for the results of this study to be more easily compared with research in this area.

Future Treatment and Research Directions

Although none of the subjects in this study showed

any improvement on the dependent measures there is some justification for recommending that this stress management training program, in a modified form, should be tested again.

First, the study allowed for the identification of a number of limitations in the treatment design. This is one of the advantages of single-subject design. Single-subject design is based on the philosophy that through the identification of laws of individual performance generalizable relationships can be identified (Kazdin, 1982). As Hersen and Barlow (1976) point out it may be more important to know why certain subjects do or do not respond to treatment than it is to know the group result. It is because of these factors that single-subject design is a useful technique for testing the effectiveness of treatment packages. It is possible with this type of research methodology to test the various components of a treatment package in order to understand, adjust and refine the overall package prior to testing its group effectiveness (Kazdin, 1982). The limitations identified in this study give rise to a clearer understanding of what may be the necessary components of an effective stress management training program for patients with fibrositis. It is therefore important to test this refined training program on a

larger number of subjects until there is a definitive answer on whether it is or is not an effective treatment intervention.

Second, the patients in this study all stated that they found the treatment program helpful. In fact when contacted by the researcher between six to nine months after the end of treatment to go over their individual test results all three subjects were continuing to use the relaxation exercises and the stress management techniques. These subjective reports should not be discounted too readily. Roy (1984) states that the common measures of treatment success include: reduction in pain time; reduction in medication intake; and increased activity level. He argues that since pain is a biopsychosocial syndrome these outcome measures appear to be too narrow and constricted as they do not identify the effect treatment may have had on the functioning of the patient in a variety of roles. Grzesiak (1977) hypothesizes that relaxation trainings' main effect is to alter a patients' attitude towards that pain and give more of a sense of control, rather than pain relief. Sternbach (1974) found that after treatment many patients increased their activity level and had an improved sense of well-being, but did not have lower pain levels. It is therefore possible that the outcome measures or dependent

variables were insensitive to measuring the actual effect of treatment. Once again, it is important that this hypothesis be tested before a final conclusion can be drawn on the effectiveness of a stress management training program in the treatment of fibrositis.

Third, stress management techniques have been used effectively in the treatment of a number of chronic pain syndromes. As yet, there is no firm data to support the argument that it it could therefore not be as effective in the treatment of fibrositis. This study has identified a number of questions that need to be answered. It is important that this type of treatment package continue to be tested and refined before a final judgement can be made on the usefulness of this approach in the treatment of fibrositis. This, after 11, is the goal of clinical research.

Recommendations

Fibrositis is a complex syndrome that involves a number of response systems. As such, it most likely calls for a multimodal treatment approach that includes medical, physiotherapy interventions and nonmedical treatment packages such as stress management training (Keefe, Brown, Scott, & Ziesat, 1982). As Gallagher and Wrobel (1982) state, it is important that pain management be multidisciplinary so that different specialities can

combine their knowledge and skills in such a way that there is a systematic accumulation of data that might otherwise be lost in separate treatment approaches. A multidiciplinary approach may also assist in reducing some of the negative effects that may occur if patients are afraid of being denied further medical treatment, or of significant others interpreting the effects of treatment as indicative that their symptoms were psychogenic or that they had been malingering (Merskey, 1974).

It also appears that any stress management training package needs to be broad based and incorporate behavioural, cognitive and physiological strategies. The cognitive component should include both re-education and cognitive restructuring. Patients need to understand the conceptual framework that allows for a nonmedical treatment approach to be used in what they have most likely previously viewed as a purely medical problem. Patients also need more education on the processes involved in chronic pain so that they understand that although many of their behaviours exacerbate their symptoms this is not an indicator of psychosomatisism or malingering. Further to this, patients may also need assistance in understanding the development of conditioned responses and the destructive coping patterns

that often accompany these. Without this conceptual basis patients may see many of the requirements of stress management training as counterintuitive and threatening, and therefore have difficulty complying with the procedures.

The subjects in this study demonstrated many negative cognitive coping patterns, such as believing they had little control over the pain, that they were overexaggerating their physical limitations and external demands and that they were responsible for ensuring that all significant others were happy and content. In order to combat some of these negative cognitive coping patterns the intervention package should include some cognitive restructuring techniques. This portion of the training could incorporate techniques such as statement substitution, and the identification and evaluation of basic irrational belief systems.

The physiological component of the training should focus on teaching patients techniques for reducing their physiological reactions to stress. This should not only incorporate relaxation training, but also stressor and stress reaction identification. This portion of the training should focus on teaching patients to recognize not only what factors increase their pain, but also what the early indicators of pain and/or increasing pain

levels are. These indicators could then be viewed as cues for initiating coping techniques as early as possible and not as symptoms that need to be avoided.

The behavioural component of the training program should focus on teaching alternative patterns of coping with stressors. The subjects in this study had difficulty with pacing their activities according to their functional level at the time. When feeling slightly better they would tend to overexert themselves and then have to face the consequence of increased pain levels for two or three days afterwards. Techniques such as problem solving, goal-planning, priority planning and time management may be tools that would help them accomplish necessary tasks without dire physical consequences. They would be able to use their symptoms as a guide for their activity level. It should be emphasized here that the goal of this training is not to teach them to avoid physical activities but rather how to maintain an activity level despite changing functional states. The subjects in this study also periodically had difficulties in stating that they were unable to comply with the requests of friends and family because of their physical condition. It may therefore also be a necessary to add assertiveness training to the behavioural component of a pain management treatment package.

It may also be necessary to hold one or two sessions with significant others. They could be briefed on all of the processess involved in fibrositis and chronic pain syndromes. In order to accomplish this it is probably advisable that significant others be involved in the educational component of the treatment program. They should also be advised as to the changes that the patient will be asked to make during treatment. Making family members active participants in treatment may reduce the potential negative effects of family confusion and/or misinterpretation of behavioural changes. This may assist in helping the patient make the necessary changes more easily.

The actual relaxation training should be long enough to allow for more directed practice and a slower integration of this technique for pain management. The slowing down of this process should assist in skill acquisiton and generalization. At this time it is unknown what is the optimal length of a relaxation training program for fibrositis patients.

It would also be useful to have each patient identify what changes they would have to see in each of the targeted treatment areas before they would consider the intervention to have been a success. This could be determined through the process of Goal Attainment Scaling

prior to the commencement of treatment. This procedure would not only make the patient a more active participant in treatment, but would also avoid the pitfall of the therapist determining treatment success.

It is necessary to submit these adjustments to the stress management training package for patients with fibrositis to empirical investigation. As stated earlier, there is not yet enough data to determine whether this approach is or is not an effective intervention, or even what the most realistic dependent variables are by which to measure it. If in future trials the refined package appears to be effective it will then be important to determine what the critical components are. It will also be important to determine if a treatment package has to intervene in all three spheres (i.e., physiological responses, cognitions and behaviour) concomitantly, or if it is more effective in some particular order. It also needs to be investigated what the weighting is of each component in the overall effectiveness of the treatment package. Perhaps more time has to be devoted to one particular response sphere than another. Finally, it needs to be determined whether direct medical involvement in the treatment package increases treatment effectiveness, decreases the length of the treatment program, or has no effect at all.

In conclusion, although this study showed no reduction in the targeted symptoms of fibrositis a number of important factors were identified that have implications for future treatment approaches and research. Fibrositis is affecting the lives of many people. Since there is currently no consensus on treatment it is important that research be continued in this area. This study has made a number of recommendations for the development of a broad based stress control program for the treatment of fibrositis. Stress management training has demonstrated its effectiveness with other chronic pain syndromes and as yet there is not enough evidence to preclude its incorporation into a multimodal treatment approach for fibrositis.

APPENDIX A

Letter to Referring Rheumatologists

Dear

Simon Fraser University, in conjunction with the Arthritis Society, B.C. Division, will be conducting a research project to test the effects of a stress management training program on the symptoms of primary fibrositis. The study will begin this summer and your participation is requested in subject recruitment between the months of May and August.

You will find listed below a description of the studies inclusion/exclusion criteria, and what is expected of you should you agree to participate. What is expected of the patient is stated in the accompanying patient information sheet. Also enclosed is a copy of a standardised explanation of fibrositis.

Inclusion Criteria

A diagnosis of primary fibrositis based upon the following criterea:

1) the presence of generalized aches and pains or prominant stiffness involoving three of more anatomical sites, for at least three months.
2) an absence of secondary causes (rheumatic, infective, endocrine or malignant) and normal laboratory tests and roentgenograms.

3) the presence of at least 12 typical and consistent tender points.

4) the presence of at least three of the following: modulation of symptoms by weather factors; aggravation of symptoms by anxiety or stress; poor sleep; general fatigue or tiredness; anxiety; chronic headache; irritable bowel syndrome; subjective swelling and numbness.

Exclusion Criteria

1) The presence of a co-existant musculoskeletal disease or angina pectoris. Patients with other mild, stable disease processes may be reffered to the study and their inclusion suitability will be assessed by the examining physician.

2) If the patient is on any tricyclic or phenothiazine medication. The patient may be included if they are on a stable dose of a non-steroidal medication and if they agree to maintaining that dose throughout the study, barring any unforseen emergencies.

3) Profound clinical depression.

4) The inability to speak English or follow instructions.

5) Active treatment of their fibrositis by either their general practioner or rheumatologist.

Expectations of the referring doctor

1) Initially explaining to the patient about the study using the patient information sheet.
2) Referring the patient for the study to Ms Marilyn Choy at the Arthritis Society, B.C. Division, 879-7511, local 213.
3) Explaining to the patient about fibrositis using the standardized patient information sheet.
4) Agreeing not to treat the patient for their fibrositis while they are participating in the study.

We feel that this is an important study as so little is known about the treatment of this prevalent syndrome. You will be forwarded the results once the study is completed.

We hope you will agree to join us in this research project. If you need any further information please feel free to call Ms. Choy at 879-7511, local 213.

Yours sincerly,

Dr. Andrew Chalmers

Lynda Gifford

Appendix B

Fibrositis Information Sheet

You have just been diagnosed as having fibrositis. This information sheet will tell you more about what that implies. To have received this diagnosis means that you have been experiencing chronic, generalized aches and pains for a while. This is even harder to deal with when there are no observable signs of your distress. Observers can often become frustrated with people who complain of pain or fatigue while looking perfectly healthy. Unfortunately, this is one of the attributes of fibrositis. This is also why it is sometimes difficult to diagnose. Fibrositis does not cripple or continue to slowly get worse. However, the pain and discomfort are real and follow a usual pattern.

Fibrositis is a rheumatic disorder. It received its name because initially it was thought to be the result of inflammation of the fibrous tissue of the muscle. However, this did not prove to be the case. Fibrositis is not a disease, but rather a syndrome; that is a collection of related symptoms. At the moment it is not known what causes fibrositis. It is thought that there may be a number of causes, and that these initiate a similar body response that results in a distinct set of symptoms. The fibrositis syndrome is characterized by

chronic, generalized aches and pains, exhaustion and increased tenderness at specific body sites. Other symptoms can include poor sleep, anxiety, chronic headahes, irritable bowel syndrome , and the feeling of swelling and numbness.

The generalized pain comes from what are called deep body structures. Unlike our superficial body parts, our brain does not have a "body image" of our deeply lying structures. Therefore the pain is referred to another part of our body and the brain misinterprets it as beginning in that part. This is called 'referred pain'. It is widely distributed and therefore it is often hard to describe exactly where it is.

The painful spots you felt when examined by your doctor are called 'tender points'. You may not have known that they were there until they were touched. Your doctor knew where to find them because they are anatomically specific in patients with fibrositis, although their number may vary. It is not known what causes them.

As in other rheumatic disorders the symptoms of fibrositis can be affected by a number of different factors. Some of those that have been identified are, heat, cold, changes in the weather, anxiety, emotional upsets and depression. These changes are not all in the head. Our body is complex and our brain is capable of

producing physical changes. The symptoms are very real, no matter what has increased them. What this means is that you may be able to alter some of your symptoms through changes in attitude, relaxation, exercise and stress reduction techniques.

Although we have known about fibrositis for a long time, it is still difficult to treat. There are a number of treatment options available, although their effectiveness may vary amoung patients. Your doctor may offer you various types of medication. These can include salicylates or other simple analgesics, to help you with your pain. Another medication may be a low dose of an antidepressant to help you sleep. Your doctor may recommend some form of heat, massage or liniment to be applied to certain painful areas. It may also be suggested that you use some type of brace at night when you sleep. This is to give your neck and back support. Exercise may also be recommended, especially for building up the abdominal muscles. Your doctor will also suggest that you look at how much stress there is in your life and how you deal with it. You may need to take some stress reduction training and learn how to relax.

One final treatment option that is available this summer is participation in a research project. Your doctor has more information about this if you are interested.

Appendix C

Study Information Sheet

You have recently learned that you have a syndrome called fibrositis. As your doctor has explained to you, although we have known about fibrositis for a long time, it remains difficult to treat. Your doctor reviewed with you the various treatment options available. One of these included participating in a research project being carried out this summer by Simon Fraser University in conjunction with the Arthritis Society, B.C. Division. Before you decide that you would like to join in this project we would like to explain to you what is involved and what will be expected of you.

Firstly, we want to emphasize that participation in this study is voluntary. If you feel that for some reason you do not wish to be involved, then that is your right. Your continued treatment will not be jeopordized in anyway. If you begin the study and later change your mind then you may withdraw, without compromising further treatment. However, if you do agree to participate we would like you to commit yourself to staying with it, barring any unforseen emergencies.

This research project will be testing the effectiveness of a stress management training program for patients with fibrositis. Your treatment will be taken

over by the research team for the length of the study. the study will will last fourteen weeks. You will be expected to be available to attend weekly meetings at the Arthritis Society in Vancouver.

You will also be asked to keep a daily record of various symptoms for the entire length of the study. Everything you need for this will be provided and it should only take you a few minutes throughout your day. At various stages in the study you will be asked to complete some measurement forms. These will enable us to see what effect the treatment is having on your symptoms. All the information that you give us is strictly confidential and will be avilable only to the research team. At the end of the study you will be offered the treatment that was the most effective (if you were not in that group).

We feel that this is an important research project. As a patient you know better than anyone how distressing the symptoms of fibrositis can be. This research should tell us more about what may alleviate some of that distress. If you would like to participate you just have to let your rheumatologist know and he or she will inform us. We will then contact you.

Whether or not you join us in this study we hope that you are able to find some relief from your symptoms.

APPENDIX D

Study Consent Form

I,_____, have read the accompanying information sheet and agree to take part in the fibrositis treatment research project.

I understand my participation will involve attending weekly group meetings at the Arthritis Society, Vancouver,as well as taking the Arthritis Impact Measurement Scales, the Beck Depression Inventory, the McGill Pain Questionnaire, and the State-Trait Anxiety Inventory on two occassions. I also understand that I will be asked to spend a few minutes each day throughout the project recording my pain level. The data from these questionnaires will be kept confidential. My responses will be coded on a computer file for the purposes of data analysis and the questionnaire will then be destroyed. I understand that I can obtain the results from my own questionnaires and a copy of the final research results by contacting Lynda Gifford at the above address.

I understand that I am free to decide the degree to which I will follow the training procedures outlined to me. I understand that I can withdraw from this project at any time I wish.

I understand that if I have any concerns or

questions about the project ~~I can tele~~phone Lynda Gifford at (number deleted) or Dr. Bryan Hiebert at (number deleted).

I have received a copy of this consent form.

_____ _____

Date Signature

APPENDIX E

Demographic Questionnaire

For the purpose of this study we need some basic information about you and how your fibrositis is affecting you. All the information you give us is strictly confidential. Please take some time to fill out this questionnaire as accurately as possible.

Subject No._____

PERSONAL INFORMATION SHEET

NAME _____ DATE _____

ADDRESS _____

PHONE _____(home) _____(work)

DATE OF BIRTH _____ AGE _____

WORKING _____

DISABILITY/COMPENSATION _____ HOW LONG _____

How long have you experienced muscle pain/tension?

____less than 1 year ____5-10 years

____1-3 years ____more than 10 years

____3-5 years

When did you first contact a physician about pain?

____less than 1 year ____5-10 years

____1-3 years ____more than 10 years

____3-5 years

When did you first see a rheumatologist?

____less than 1 year ____5-10 years

____1-3 years ____more than 10 years

____3-5 years

What kinds of doctors have you seen since your pain first began?

____Rheumatologist ____Chiropractor

____Naturopath ____Acupuncturist

____Physiotherapist ____Other

Have you received any other diagnosis for your symptoms other than fibrositis?

____Yes ____No

If yes please list the names of those conditions.

How long ago did your symptoms begin to interfere with usual activities?

____less than 1 year ____5-10 years

____1-3 years ____more than 10 years

____3-5 years

Have you received any previous treatments (including medication) for your symptoms? How effective were these treatments? (0=No effect 1=Low Level Effect 2=Moderately Effective 3=Very Effective).

Treatment _____ Effectiveness _____

_____ _____

_____ _____

_____ _____

What is your most troublesome symptom?

Please rank in order of concern the areas where you experience aches or pains.

1. Neck pain 1. _____
2. Shoulder pain 2. _____
3. Low back pain 3. _____
4. Hip pain 4. _____
5. Other pain 5. _____
   (please specify)

How much time do you spend experiencing pain?

1. 10% of my time
2. 25%
3. 50%
4. 75%
5. Nearly all of the time

What relieves your symptoms or makes you feel better.

1. Heat _____
2. Massage _____
3. Medication _____

   (please specify type) _____
4. Relaxation _____

   (please specify type) _____
5. Recreation _____

   (please specify type) _____
6. Other _____

What makes your symptoms worse at the moment?

1. Heat
2. Cold
3. Weather changes
4. Emotional upsets
5. Stress
6. Exercise
7. Anxiety
8. Other _____

Do you believe that you have control over your pain?

1. No
2. Somewhat
3. Usually
4. Always

Sleep problems (1=Rarely; 2=Sometimes; 3=Often)

1. Do you have trouble getting to sleep? _____
2. Do you wake up at night and have trouble getting back to sleep? _____
3. Do you take medication to sleep? _____
4. Do you feel tired in the morning? _____
5. Do you feel tired during the day? _____

Do your symptoms interfere with any of the following areas? (1=Rarely; 2=Sometimes; 3=Often)

If so, how?

1. Activity ___ _____
2. Work ___ _____
3. Social ___ _____
4. Personal relationships ___ _____

Please check if any of the following mood states apply to you (1=Rarely; 2=Sometimes; 3=Often)

1. Depression ---
2. Anxiety ---
3. Anger ---
4. Frustration ---

list medications you are now taking for medical problems.

Name of Drug	Dosage (amount-times/day)	How long	Effect
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

APPENDIX F

Treatment Protocol

Training Session I - Introduction to relaxation therapy

Overview

1. Structure session
2. Introduction to stress
3. Introduction to the relaxation response
4. Introduction to relaxation training
5. Relaxation exercise
6. Summarize session
7. Homework

I. Structure Session

A. Overview of the program

- we will be meeting once a week for 6 consecutive weeks.
- each session will last 50 minutes with the first 20 minutes devoted to theory, the second 20 minutes devoted to practice, and the last 10 minutes for summarization
- you will be learning about your physical responses to stress and how you can reduce these responses through relaxation training

- each session will include actual relaxation practice
- each session will be summarized
- homework will be assigned at the end of each session

B. Overview of this session

- this first session is to give you some background information so that the rest of the program is understandable
- we will begin by discussing stress and how relaxation can be used to counter stress
- we will then go through a relaxation exercise
- finally, we will talk about the relaxation exercise and how this will fit into the program that is designed to train you to relax whenever you want to
- this first session will probably take a little longer than the others

please stop me at anytime if something is unclear

2. <u>Introduction to Stress</u>

A. What stress is:

- there are currently three views on what stress is
- the first is that stress is the bodies response to any demand placed upon it
- therefore it is due to our physical response and stress management focuses on changing these

physical reactions

- the second view is that stress is the result of the pressures in our environment, therefore it is due to an external cause
- and stress management focuses on changing our environment
- the third view is that stress is the result of an interaction between our physical reactions and external demands
- and stress management focuses on changing both of these
- the last view is more popular and seems to fit into peoples common experience of stress
- I will be following this last approach
- stress results from an interaction between personal factors (how we view the situation, the amount and type of coping skills we have)
- and environmental factors (how difficult the situation is, how threatening the situation is to us, etc.)
- I am defining stress as a complex reaction to a situation that exceeds a persons ability to cope with that situation
- the environmental factors are usually referred to as "stressors"
- the term "stress" usually refers to the persons

reaction to the stressor

- it is important to understand that a certain amount of stress is perfectly normal for 2 reasons
- first, it is normal because everyone experiences it
- second, it is part of the way in which our body warns us that something is potentially threatening
- it is therefore a protective mechanism.

B. Transitory versus chronic stress

- when under stress we automatically try to restore balance to our body and our environment
- we do this by engaging in coping behaviours, that is by trying to handle the situation
- when the demand on us decreases, or if our coping attempts are successful, our body begins to return to normal and balance is restored
- when a stressor is encountered (e.g. an accident, a work demand) we typically react, handle the situation, and return to normal, with few negative side effects
- this passing reaction is called transitory stress
- however, if the stressor continues, or if our response system is continually being activated, and we rarely restore our body's balance, then our hightened physical state is maintained and chronic stress is the result
- prolonged stress is harmful as it wears down the

body and can result in various forms of physical damage

- medical evidence now clearly demonstrates demonstrates that stress can make the symptoms of any physical disorder worse

-because of this relaxation training is becoming an essential component in the treatment program of chronic pain syndromes for several reasons

-it lowers the physical arousal level during stressful times as well as speeding up the return to a normal state after we have been stressed - lowered physical arousal means less pain

-it acts as a distractor from the pain, and this has been shown to lower the amount of pain experienced

-and it allows people to do something about the pain and therefore gives them more control over it - this has been shown to lower the amount of pain experienced

C. What stresses us:

-stress is the result of a situational demand and our perception of our ability to cope with that demand

-the demand may be external (noisy children, an actual danger to ourselves) or internal (worrying

about delivering a speech, thinking about a meeting with your childs teacher, etc.)

-when a demand occurs we assess our ability to cope with it

-if we feel we can handle the situation, stress is either not experienced or decreases as we cope with the demand

-however, if we feel our coping strategies will be ineffective our stress response will continue

-also what is a stressor for one person may not be a stressor for another

-and what may be stressful one day, may not be stressful on another, depending on our ability to deal with it, e.g.excessive tiredness, number of demands

D. Stress reactions

-the stress reaction has 3 components

-first, the physical component consists of heightened physical arousal such as an increase in heart rate, respiration rate, muscle tension, endocrine secretion, etc.

-this is called the fight-or-flight response; our body is preparing either to fight the stressor or run away from it

-second, the cognitive reaction is what we think about the situation and involves an appraisal of the

degree of threat in the situation and of our ability to cope with it

-this can result in an overexaggeration of the demand involved and an underestimation of our ability to cope with it

-third, the behavioural reaction results in such habits as increased smoking and drinking, nail-biting, speedy behaviour etc.

-these 3 components tend to occur as an integrated response - that is, they all happen more or less together

-a change in any one of these components typically leads to a change in the other 2

-everyone reacts to stress in a general way with increased heart rate, muscle tension, etc.

-however, we all tend to have a personal pattern of stress reaction so that if we get a knot in our stomach during rush hour traffic, we will tend to get a knot in our stomach when the boss yells at us

-our reactions to stressors are termed automatic because they just seem to happen i.e. we don't try to produce them

-however over time we have learned to associate certain situations with stress

-this association is often so strong that a habit is formed of reacting stessfully to situations that

have little or no real danger to us

E. Coping with stress

-because stress is a learned interaction between the environment and our internal reactions to it we can change and feel less stressed whether or not the environment or other people change

-if it was only the result of the environment then we would often be at its mercy as there are things that we cannot change

-however, if we have learned our what are stressors for us to start with it means we can learn new ways of dealing with them

-this is the basis of relaxation training

-do you have any questions so far about what I have said?

III. <u>Introduction to the relaxation response</u>

-typically when people are stressed they experience an increase in heart rate, respiration rate, muscle tension, etc.

-and typically when people relax they experience the opposite of this; a decrease in heart rate, respiration rate and muscle tension etc.

-this is called the relaxation response

-the goal of relaxation training is to develop this physical response as it is incompatible with the stress response

-that is, you cannot be relaxed and stressed at the same time

-there is growing medical evidence that when people are relaxed they are more productive and have fewer health problems

IV. Introduction to relaxation training

A. The goal of relaxation training

-as I said earlier, although we respond to stress cognitively, physiologically and behaviourally, a change in any one of these areas typically leads to a change in the other 2

-these training sessions are aimed at teaching you to change your physical response to stress

-this is important in any physical illness, and especially with a musculoskeletal syndrome like fibrositis

-the training has 2 major goals:

1. to train you to use the relaxation response whenever and wherever you decide to
2. to identify those situations that are generating the stress response in you so that you know where it would be appropriate for you to use your skill in relaxation

B. What the training consists of

-the procedures that I have been discussing in terms of reducing your tension are collectively called

progressive muscle relaxation

-they were first developed in the 1930's by a physiologist called Jacobson, and since then have been modified to make them simpler and more effective

-the first part of the training consists of learning to sequentially tense and relax various groups of muscles all through the body, while at the same time paying close atttention to the sensations associated with tension and relaxation

-we will be focussing on decreasing the physical arousal caused by stress. However many people find that there is an accompanying mental calmness

-you may think it is strange that to produce relaxation we start off by tensing the muscles

-there are 3 reasons for this:

1. I want you to learn to produce large and noticeable reductions in tension and the best way to do this is to produce a good deal of tension in the muscle group first. The release of this tension creates a momentum which allows the muscles to drop well below their previous level of tension - this is the pendulum effect
2. It will give you a chance to focus on the tension and therefore become aware of what it feels like in each of the muscle groups - some

people are so used to being tense they no longer know what tension feels like

3. This procedure provides you with a vivid contrast between tension and relaxation and will give you an opportunity to compare the two and appreciate the difference

-knowing the difference between the sensations of tension and relaxation is the first step in learning to relax

-it is important that you do not overtense your muscles especially those that are painful

-during the exercise only tense the muscles to a level that you feel safe with

-the tension exercise is not comfortable but neither should it be painful

-the second part of the training involves the use of imagery

-I will ask you to imagine various relaxing scenes

-this is to help you become even more deeply relaxed

-initially the relaxation exercises are quite long but as the training progresses I will be teaching you shorter versions

C. The importance of practice

-it is important to understand that learning the relaxation response is like learning any other skill

-in order for you to get better at it you have to

practice, just as you would if you were learning to drive a car

-it is important to realize that progressive relaxation training involves learning on your part

-and this learning is slow and gradual

there is nothing magical about these procedures

-each new proceedure takes a lot of practice and is carefully and gradually introduced into your everyday life

-we have spent years learning to become tense and we must give our bodies time to learn an alternate response

-without your active cooperation and regular practice of the things that you learn each week, the training of little use

-do you have any questions about what I've said so far?

V. Relaxation Exercise

A. Preliminary instructions

-relaxation is a passive exercise - that means you do not work hard at it; you don't try to relax

-I want you to passively follow my instructions and relaxation will occur as a byproduct of this

-if your mind wanders don't become upset, just let yourself drift back to my voice and begin following my instructions again

-I will be dealing with a number of muscle groups

-when I ask you to tense a group of muscles I want you to do so immediately, but only to the point that feels safe for you

-when I tell you to relax that group of muscles I again want you to do so immediately, don't gradually let them go

-I will be asking you to notice the sensations when you are tensing the muscles and when you are relaxing them

B. Relaxation sequence

(each procedure is demonstrated by the therapist as it is being described)

-I will briefly run through the sequence of muscle tensing before we start the actual exercise

-we will begin with tensing the right hand by making a fist

-you should be able to feel the tension all around the hand and the fingers

-now let it go immediately

-next we tense the lower right arm by bending the hand backwards, and relax

-the upper right arm is tensed by pushing it in towards your chest - make sure that you are tensing only the muscles that we are focussing on and not the rest of the arm, and relax

-now we move over to the left arm and follow the same sequence

-clench the left fist, and relax

-next the left lower arm, and relax

-and now the left upper arm, and relax

-now we move to the shoulders. Push both your shoulders up to your ears. You should feel the tension all across the shoulders. Now let it go.

-the neck is tensed by first of all pushing your head down into your shoulders and then stretching it up like a giraf, and relax

-now we move to the facial muscles

-tense your forehead either by pushing your eyebrows up or by pushing them togther. Pick whichever one creates the most tension for you, and relax

-now close your eyes tightly as though you're protecting them from a sandstorm or blinding light

-good, now let them go

-the cheeks are tensed by making the biggest upward smile that you can, and relax

-the mouth is tensed by pushing your tongue flat against the roof of the mouth, and relax

-finally the lower part of the jaw is tensed by clenching your teeth, and relax

-now we move to the chest and back area

-push your shoulder blades together and this will

tense your upper back, and relax

-I want you to place one hand on your chest and the other on your stomach

-now take a deep breath in for the count of 4, 1,2,3,4. Good, now let it out. You should feel your chest and your stomach rising as you breath. If your stomach is not rising you are breathing too shallowly and need to practice some deep breathing.

-the deep breath tenses your chest muscles. You don't have to place your hands on your chest and stomach during the relaxation exercise. That was just for demonstration purposes

-now I want you to tighten up your stomach muscles as if you were going to be hit. Do this either by sucking in your stomach or by pushing oout hard against the wall of your stomach - use whichever one creates the most tension, now relax

-now we are going to move down to the legs

-start by tensing the right thigh. Straighten your leg, lifting it a little and pressing down and away from you with your heel, and relax

-now tense the lower leg and calf area by bending your foot back and pulling your toes towards you, and relax

-now tense your right foot by turning the foot inwards and curling the toes, and relax

-the same sequence is followed with the left leg

-tense the left thigh, and relax

-the left lower leg and calf, and relax

-and the left foot, and relax

-now that is the sequence we will be following

-do you have any questions before we begin the actual exercise?

C. Relaxation exercise

Preamble

-some people find it difficult to picture the scenes described. If you have trouble with imagery then just think about what I am saying instead, it works just as well

-some people find it really difficult to relax with thers around. If you experience that difficulty then go through the exercise so that you know what to do at home but do not worry if you don't experience any relaxation. It will come with practice

-before and after each relaxation exercise I want you to take your pulse and respiration

-people generally find that after the exercise these are lowered, and charting them gives them a good idea of how they are progressing in their training

-you find your pulse by putting 3 fingers on the side of your neck and slowly running them in towards the

windpipe

-you should feel your pulse in the dent

-would you try that a couple of times to make sure you can find it consistently

-good. Now you count for 30 seconds and double the final number

-lets try that a couple of times

-your respirations are counted for 30 seconds as well

-lets try that a couple of times

-do you feel you are able to take these measurements accurately?

-I will be giving you sheets to record these on before and after each of your home practices

-each week you will hand them in as it will let me know how your practices are going

-now I want you to find yourself a comfortable position

-let me know if you need any pillows or additional supports

-you may want to cover youself with your coat as some people get a little chilly when relaxing

-if for some reason you feel you do not want to continue with the exercise let me know

- are you ready to begin?

-find your pulse and start counting when I tell you to

-start counting

-stop counting and write down your pulse - remember it is the number you counted doubled

-now count your breaths when I say start

-start

-stop counting and again write down the number doubled

-now we will start the exercise

RELAXATION EXERCISE PRACTICE SESSION

VI. Session Summary

-I just want to briefly summarize what we have covered today. We will be going over it again in future sessions.

A. Stress

-stress is the result of some demand and our reaction to it

-our reactions are an attempt to meet the demand and therfore reduce the pressure

-most of the stressful situations and our reactions to them are learned

-we react cognitively, behaviourally and physiologically to stress

-a change in one of these areas effects the other 2

-we can learn new ways of reacting to stress

B.Relaxation response

-stress reults in an increase in heart rate, respiration rate, muscle tension and endocrine secretion

-the relaxation response brings about the opposite of this

-the relaxation response can be learned

C. Relaxation training

-relaxation training focuses on reducing the physiological arousal of stress by teaching people how to induce the relaxation response whenever and wherever they wish - you cannot be relaxed and tense at the same time

-it is a learned procedure that takes regular practice

-it starts by getting you to tense and relax various groups of mustles so that you begin to recognize the difference between tension and relaxation

-imagery is used in order to deepen the relaxation experience

-a relaxed body has less physical problems and typically a relaxed state of mind accompanies the relaxation response

- do you have any questions?

VII.<u>Homework</u>

-as I said earlier, these exercises will only be

effective with regular practice

-you will take a tape home and I want you to practice once a day

-right now only use side 1 of your tape

-now there are some essential prerequisites for this

-you must have a quiet place where you are not going to be distracted by outside noises

-you must have enough time to do the exercise without being disturbed

-it is preferable that you do the exercise in a darkened room so that you can relax

-finally you must have an area that you can get comfortable in; either lying down or resting in a comfortable reclining chair. Make sure your body has enough support so that it can relax

-try not to fall asleep as the idea right now is for you to learn how to relax when you need to and not to send you to sleep whenever you do the exercises

-however if you use the exercise to help you get to sleep then make sure you practice at some other time during the day as well

-do not try and use the relaxation exercise in everyday life yet. This will be introduced slowly and carefully at a later date

-here are some sheets for you to record your pulse and respiration on before and after each practice

session

-are there any questions before we close?

Session 2: Review of the concepts of stress and relaxation and introduction of keeping a stress log

Overview

1. Structure session
2. Review home practice
3. Review the concept of stress
4. Review the concept of relaxation
5. Introduce log keeping
6. Relaxation exercise
7. Summarize session
8. Homework

1. Structure Session

-I want to briefly state what we will be covering today

-first of all we will be discussing how your home practice went

-next I want to review the concepts of stress and relaxation

-then I will be talking to you about stress logs

-we will then have a relaxation session

-and we will close by summarizing what we we did and by assigning homework again

2. Review home practice

-can I collect your pain booklet and relaxation sheet

-did you have difficulties with the home practice?

-did you manage to practice everyday?

-did you have trouble keeping their relaxation record?

-did you notice any differences in your ability to relax the more you practiced?

3. Review the concept of stress

-last week I defined stress as a complex reaction to a situation that exceeds a persons ability to cope with that situation

-if we view the demand being made upon us as threatening, or if we feel we do not have the skills to cope with it we will experience a stress reaction

-therefore, stress results from the interaction between personal and environmental factors

-the stress reaction is made up of 3 components: physiological, cognitive and behavioural

-there are general characterisitics to a stress

reaction but each of us has our own individual pattern e.g. increased heart rate, muscle tension, upset stomach

-these reactions happen so quickly that they are called automatic

-however we have generally learned what situations will be stressful for us

-this means that we can learn new and more helpful responses in these same situations

-chronic stress, that is a stress reaction that is ongoing, is harmful as it wears down the body and can result in various forms of physical damage

4. Review the concept of relaxation

-the opposite of the stress response is the relaxation response

-the relaxation response is evident by a decrease in body arousal such as heart rate, respiration rate, muscle tension, etc.

-this relaxation response can be learned

-the goal of relaxation training is to develop this physiological response as it is incompatible with the stress response

-a change in the physiological component of the stress response usually results in a change in the other 2

-to be of any use relaxation training needs your active co-operation and regular practice

5. Introduce keeping a log

-we have discussed the fact that everyone has their own individual stress reaction

-to learn when we need to induce relaxation means learning to recognize when we are stressed

-there are 2 parts to this learning

-firstly, we know we are stressed because our body tells us so e.g. upset stomach, headache

-we can tune out many of these ~~phy~~sical indicators of stress so that, for example, we end up with a headache because we didn't listen to our body when it was trying to warn us it was stressed with tight neck muscles

-a stress reduction technique is more successful the sooner it is introduced

-therefore it is important that we start learning what are the initial physical signs of stress for us

-secondly, in order to reduce our stress we also have to start learning which situations are stressful for us

-once again, we can become so familiar with being stressed in a certain situation that we no longer notice it or, maybe we only notice it when we are

'out of it

-once we know what situations are stressfull we can either change the situation or change our response it

-the major point here is that we have to start tuning into ourselves - our ~~body~~ is giving us lots of

-people who experience chronic pain have learned to not pay attention to their body, as a means of coping with the pain.

-although this may be protective in the short term, it can be damaging in the long term

-if we ignore the warnings our body is giving us, we will continue to maintain a hightened arousal state, and therefore continue with an increased heart rate, muscle tension etc.

-this can only lead to further physical damage and therefore increased pain in the long run

information if we would just take the time to listen

-many people find that keeping some kind of log helps them find out this information

-they write down what situations they found stressful and what physical sensations they experienced

-this gives them more accurate information than trying to remember what they felt a couple of days after the event

-these notes should be jotted down at the time of

the stressfull event

-a time gap between the event and the recording means that you are relying on your memory and the information will not be as acurate

-here are some logs for you - there are 7 pages and I will give you fresh ones each week

-on the left hand side is a column for the date and time - some people find that certain times of the day are worse for them than others

-the next column is for the event - what was actually happening, i.e. where you were and what was going on

-the next is to rate how stressful the event was - on a scale of 1 - 5 with 1 being mildly stressful and 5 being as stressful as it could be

-the next column is for you physical reactions e.g. if you felt your heart beat faster, or your stomach becbme upset etc.

-the last column is for any additional comments

-I want to record this as the events happen throughout the day for 2 weeks

-then when you have become skilled at this I will be teaching you a shorter method

-I am aware that you have quite a few things to keep track of

-they are all important and will be well worth the

time that it initially takes you

-the logs will help you recognize when you are stressed and what it is that stresses you

-as I said, as you become more proficient at this I will be teaching you progressively shorter versions

-are there any questions before we continue?

6. Relaxation exercise

-now we will have our relaxation time

-once again find yourselves a comfortable position

-are you ready?

RELAXATION EXERCISE PRACTICE SESSION

7. <u>Summarize Session</u>

-let us briefly review the main points of todays session

-good stress reduction techniques come from learning to recognize when we are stressed and what it is that stresses us

-we know we are stressed because our body tells us so with certain physical signs and symptoms

-we have to start paying attention to our body

-keeping a log helps us get that information accurately

-initially we need to jot down the information as the event happens

-as we become more skilled at this we can learn shorter methods

-are there any questions ?

8.Homework

-I want you to continue practicing your relaxation exercise once a day

-I also want you to keep your stress log and to review it before coming next week

-when you review it I want you to look for any situations that keeping coming up

-any physical signs or symptoms that keep coming up

-what you are looking for are your particular patterns of stressors and stress responses

-do you have any questions before we close? Training

Session 3 - Review of keeping a stress log and introduction of cue-controlled relaxation

Overview

1. Structure session
2. Review home practice
3. Review stress log

4. Introduce cue-controlled relaxation
5. Relaxation exercise
6. Summarize session
7. Homework

1. Structure session

-today we will be starting out as usual by discussing how your home practice went

-we will then talk more about the stress log and anything that you have noticed about yourselfas you have been keeping it

-next I will be introducing a new relaxation technique called cue-controlled relaxation

-we will then have our relaxation session

-todays session will close by summarizing what we talked about and assigning this weeks homework

2. Review home practice

-can I have your pain book and relaxation sheet

-did you have any difficulties with your relaxation practice?

-did you manage to practice everyday?

-did you have any trouble keeping your relaxation record?

-did you notice any differences in the level of relaxation as you practiced more?

-do you have any questions about the home practice?

3. Review stress log

-last week we talked about the need to recognize what our symptoms of stress are and in what situations they arise

-one way of doing this is by keeping a stress log

-this gives us more reliable informtion about ourselves

-a log helps us to identify what warning signals our body is giving us that we are becoming stressed

-we can then use these signals as a reminder that we need to induce relaxation

-a log also helps us to identify what situations are stressful for us

-we can then decide if we should either change the situation, change our reaction to it, or both

-you have been keeping a log for one week now

-did you have any difficulties doing this?

-you were asked to review your log before todays session for any recurring physical symptoms or situations

-what symptoms or situatons did you notice?

-I would like you to continue monitoring yourself in the same way for another week

-2 weeks of close monitoring usually gives people

enough information to review their stress reactions accurately

-are there any questions before we move on?

4. Introduction to cue-controlled relaxation

-in some ways we should be discussing this technique next week as it is the shortest version of relaxation induction

-but I want you to have had as much practice as possible with this technique during this training course, and have had enough time to introduce its use slowly into everyday life

-so next week we will discuss another short version of relaxation induction, but it is not as short as this one

-you will have noticed that in the relaxation exercise I instruct you to take 2, 4 count breaths

-I wanted you to have had enough practice at the full relaxation technique before I explained the purpose of those breaths

-the goal of relaxation training is for you to be able to become relaxed whenever and wherever you need to

-one way of doing this is to train your body to become relaxed in response to a self-produced instruction or cue

-with practice you will be able to relax your body by taking those 2, 4 count breaths; they are now your cue to relax
-let me explain the theory behind this
-we know that things which happen at the same time become associated with each other, or in psychological terms, a conditioned response
-and the more often the events occur together, the stronger the association or conditioning
-the 2, 4 count breaths, or your relaxation cue, has been placed at the end of the relaxation exercise so that you are relaxed when you say it
-a strong association is then built between the cue and the feelings of relaxation
-after much repitition and practice the cue will be able to "trigger off" relaxation
-there are some important points to remember in building up this association
-you must reserve your cue only for producing the relaxation response
-it must be repeated several times at the end of your relaxation practice so as to strengthen the association between your cue and your feeling of relaxation
-with practice the association between your cue and relaxation will be so strong that simply using your

cue will produce the relaxation response

-the use of the cue in everyday situations is introduced slowly

-to begin with, the cue is only used in nonstressful situations, where you are sure that the cue will produce relaxation

-for example, when you are sitting quietly in a chair, or lying on a sofa

-you should not initally use the cue when you are feeling stressed

-the cue is then gradually used in more demanding situations

-it is important to keep in mind that you want to proceed so gradually that your cue will work in each new situation

-this is to build a strong habit of a successfull cue

-when you have a well developed relaxation cue you can use it for a "mini-relax" throughout the day

-you can also use it to help you relax when you feel stressed

-the plan is to catch yourself when you're just starting to tense so that you can use your cue to produce relaxation

-with practice this sequence will become a habit

-you can also use your cue several times during a situation to keep you relaxed e.g. a job interview

-or you can use your cue to help you relax back to normal after meeting an unexpected stressor

-in each of these cases you will be actively engaging in a coping strategy to combat stress - no one will notice you taking deep breaths, therefore this technique can be used anywhere and at any time

-but remember, at first only use it in nonstressful situations and proceed gradually according to the instructions that I will be giving you

-are there any questions about cue-controlled relaxation?

5. Relaxation exercise

-once again we are going to practice the relaxation exercise

-today, however, at the end of the exercise I am going to have you practice becoming relaxed again with your cue

-I will take you back into relaxation with your cue and out again 3 times at the end of the relaxation exercise

-you will be practicing this same technique at home

-are there any questions before we begin?

- O.K., get yourself comfortable

RELAXATION EXERCISE PRACTICE SESSION

6. Session Summary

-we reviewed today the fact that self-monitoring helps us to identify how we physically react to stress and what situations are stressful for us

-this information enables us to activate coping techniques to deal with the stress

-we also discussed cue-controlled relaxation

-this technique helps us to become relaxed in response to a specific cue

-this cue must be used only for inducing relaxation

-because the cue is placed at the end of the relaxation exercise an association between relaxation and the cue is developed

-this association is strengthened by lots of practice and the slow, careful introduction of its use into everyday situations

-once we have a well developed cue we can use it to induce relaxation throughout the day in a variety of situations

-are there any questions?

7 Homework

-I want you to continue practicing the full relaxation exercise once a day

-however, at the end of the exercise I want you to

put yourself back into relaxation and out again 3 times using your cue, just like we did today

-you will have to do this yourselves as it is not on the tape

-I also want you to practice using your cue during the day but only when the conditions are ideal, for example when you are watching T.V. or sitting reading; never when you are feeling stressed

-try and do this as often as possible

-keep up your self-monitoring as well

-next week we will discuss how this will be shortened

-are there any questions before we close?

Training Session 4 - Review of cue-controlled relaxation and introduction of the short relaxation exercise

Overview

1. Structure session
2. Review home practice
3. Introduce shortened self-monitoring techniques
4. Review cue-controlled relaxation
5. Introduce short relaxation exercise
6. Relaxation exercise
7. Session Summary
8. Homework

1. Structure Session

- can I have your pain chart and relaxation sheet
- as usual we will begin by reviewing your home practice
- we will then talk about shortening the self-monitoring proceedure
- next, I will be introducing the shorted version of the relaxation exercise
- and then we will practice it
- as usual, the session will close by summarizing what we have talked about and assigning homework

2. Review home practice

- did you have any difficulties with your home practice?
- how are you finding the process of putting yourself back into a relaxed state with your relaxation cue?
- in which situations did you practice useing the relaxation cue
- did you have any difficulties with this?
- what are the differences that you are noticing as you practice more?

3. Introduce shortened version of self-monitoring

- you have been monitoring yourself now for 2 weeks
- what have you noticed about yourself since you have been doing this?
- now that you are familiar with the self-monitoring technique I want to start you on the first step to shortening it
- I want you to still stop and think about the situations you are finding stressful as they occur
- think about how stressful these are, and how you are reactingto them physically
- but I now want you to write down at mealtimes and at the end of the day what has been happening to you up until that point
- this is to teach you how to continually monitor your stress responses mentally
- writing things down periodically helps to keep you on top of your monitoring as the mental habit is being more strongly developed

4. Review cue-controlled relaxation

-you have been practicing cue-controlled relaxation for one week now

-I would like to briefly review some of the main points about this technique

-the goal of relaxation training is for you to be able to become relaxed whenever and wherever you need to

-one way of achieving this is to associate a cue with the feelings of relaxation

-the cue must be repeated several times at the end of your relaxation practice and only when you feel completely relaxed

-it takes several weeks of practice to strengthen the association between your cue and the feelings of relaxation

-you must reserve your cue only for producing the relaxation response

-the use of the cue in everyday situations is built up slowly

-you want to proceed so gradually that your cue will work in each new situation

-eventually you will be able to use your cue to produce the relaxation response when you notice your first physical indicator of stress

-last week you practiced using your cue in relaxed, nonstressful situations

-this week I want you to practice using your cue in mildly stressful situations

-do not use the cue in more demanding situations

-as I said it is important to go so slowly that your cue will work in each new situation you apply it to

-this process takes several weeks of practice, and you need to go at your own pace

-I want you to practice this several times throughout the day

-do you have any questions about this?

5. Introduce short relaxation exercise

-I want to introduce you this week to another shortened version of the relaxation exercise

-this version relies mostly on you recalling what each of the muscle groups felt like when relaxed

-this version of the exercise not only allows you to have shorter training sessions, you can also use this technique in real life situations when you feel you need more than your relaxation cue

-some situations are more demanding than others and some people find this version of relaxation induction more helpful during those times

-I will start out by having you tense and relax your right hand

-you will then place your right hand on your left hand

-I will then talk you through the other muscle groups

as the relaxed feeling in your right hand spreads through the rest of your body

-no other muscles will be tensed

-we will then go into the imagery portion of the exercise

-once again, at the end, I will include your relaxation cue and have you go back into relaxation and out 3 times

-are there any questions about this before we do the actual exercise?

RELAXATION EXERCISE PRACTICE SESSION

6.Session Summary

A.Self-monitoring

-after having enough practice at the longer version of self-monitoring you can begin to start shortening the proceedure

-the first step is to review various situations mentally as they occur to see how stressful they were and how you reacted to them physically

-at each mealtime and at the end of each day, spend 5 minutes reviewing the previous period for stressfull events and your reactions to them

-this 5 minute review is written down

B.Cue-controlled relaxation

-you can now begin practicing your cue-controlled relaxation in mildly stressful situations

-it should not be used in more demanding situations

-you are very gradually introducing its use into everyday life

-it should still be practiced at the end of your relaxation exercise in order to strengthen the association

-it takes several weeks of practice to do this and it is important that you go at your own pace

C.Short relaxation exercise

-once skilled at inducing the relaxation response with the long exercise, you can move onto the short version

-this version can be used for home practice and for everyday demands

-it relies on you being able to recall what the muscles felt like when relaxed

-this version also needs consistent practice to be effective

-do you have any questions?

7.<u>Homework</u>

-I want you to continue with the self-monitoring using the format we discussed today

-I want you to continue practicing your relaxation exercise daily

-however, I want you to alternate the long and with the short version

-use the long version one day and the short one the next

-the short version is on side 2 of your tape

-at the end of each exercise I want you to practice using your cue to put you back into relaxation 3 times

-also practice using your cue in mildly stressful situations, none more demanding than that

-are there any questions before we close?

Training Session 5 - Review of shortened version of relaxation exercise and introduction of differential relaxation

Overview

1. Structure session
2. Review home practice
3. Continuation of shortened self-monitoring techniques
4. Introduction of differential relaxation
5. Relaxation exercise

6. Session summary

7. Homework

1. Structure session

- can I have your pain chart and relaxation sheet
- todays session will of course begin with reviewing your home practice
- we will then talk about how to shorten your self-monitoring even further
- and I will be introducing you to another variation of relaxation called differential relaxation
- we will then practice that
- and close by summarizing the session and homework

2. Review Home Practice

- first of all how did you get along with the shortened version of the self-monitoring?
- were you able to mentally check yourself throughout the day for your stress reactions?
- did you find that you were able to remember at mealtimes and at night what had happened throughout the day?
- did you have any other difficulties with this technique?
- O.K. how did the relaxation exercise go?

- were you able to become as relaxed with the shorter version?
- did you manage to put yourself back into the relaxed state with your relaxation cue?
- how did your practice go with using your cue in mildly stressful situations?
- are you finding it helpful?
- did you have any other difficulties with any other part of the homework?
- are there any other questions before we continue?

3. Continuation of shortened self-monitoring

- the purpose of self-monitoring is to teach you to keep an eye on yourself in regards to stress
- it's aim is to train you to be aware of what is going on in your body so that you can institute active coping methods as soon as you begin to feel stressed
- now that you have become skilled in more formal methods of self-monitoring you can advance to the informal method
- you are now able to recognize what is the first physical indicator that you are becoming stressed
- what I want you to do now is to use this knowledge throughout the day as the event occurs
- when you notice the first physical symptom or

symptoms of stress I want you to stop and consider the following:

1. what is it about the situation that is stressful
2. can you change the situation
   -if yes, then what can you do to change the situation
   -if no, then change your reaction to it by inducing relaxation
3. institute a relaxation technique

- it is a good idea to periodically scan your body for tension that you may be ignoring
- if you make a habit of doing this at mealtimes you will have a reminder to do this
- because it is easy to slip back into old habits, I still want you to take 5 minutes at the end of the day to review the stressful times you noted mentally and then write them down in your log
- this is for a couple of reasons:

1. it keeps you in the habit of tuning into yourself
2. it gives you a chance to review any new situations that have arisen, and to think about the effect they had on you
3. it gives you an opportunity to note any new physical reactions you may have

experienced. Unless we formally note these down we have a tendency to forget them

- I want you to complete this nightly charting for the next week, in order to strenghthen the habit
- the continual body scanning should continue indefinately; that is, become a firm habit
- are there any questions about this?

4. Introduction of differential relaxation

- a variety of muscles become tensed during most behaviours
- muscles necessary for the accomplishment of an activity are frequently more tense than they need to be
- and muscles unnecessary for efficient performance become tense during the activity
- ideally, in terms of conserving energy and maintaining a low tension level, only those muscles directly involved in an activity should be tense
- and they should only be tensed only so that they can performe the activity
- do you follow that?
- this is the goal of differential relaxation
- relaxation is induced and maintained in the

muscles that are not required for the activity
- and excess tension is eliminated from the muscles involved in the activity
- the procedure involves periodic identification of tension during daily activities
- and the relaxation of those muscles that are unnecessarily tense
- once again there is a slow introduction of this skill into everyday use
- it begins with practicing this technique with relatively quiet activities and progressing slowly to more active behaviours in more stimulating surroundings
- first of all you must practice defining essential and nonessential muscle groups
- for example, what are the essential muscle groups being used while we are sitting?
- now the rest are nonessential
- scan these for tension especially the shoulders, jaw, eyes etc.
- lets stand up and do the dame thing
- focus on what muscles are essential for this activity
- and now scan the nonessential muscles for excess tension
- O.K. sit down

- once we have identified essential from nonessential muscles we can proceed to relax the muscles not in use and to lower the tension level of the muscles in use
- we do this by using our relaxation cue and by telling the muscle groups to relax, which they will do by recall and training
- there are 2 things to note about this procedure
- first, it is not intended that nonessential muscles be completely relaxed
- the idea is to limit activity to a minimum but not to disrupt the activity
- second, although it initially takes some deliberate effort to remember to use differential relaxation, as the skill progresses it will become habitual and very little time and effort are required
- the ultimate goal of this technique can be characterized by the following example:

  A person is driving to work and is using his arms and feet and eyes. He scans his body and notices that his forehead and shoulders are tense and so relaxes them. When he gets to work he is sitting at his desk writing. He is using his right arm and hand and neck muscles. When he scans his body he notices

that he is carrying a lot of tension in his left arm, across his shoulders, his forehead and jaw. He relaxes those. He also notices that he has more tension than he needs in his writing hand and focuses on reducing the tension level there. This is all done as he continues his task.

- once again to be able to utilize this technique successfuly it must be practiced
- until you are skilled at it, you should practice it for no more than 5 minutes, 4 times a day
- the practice always includes 3 elements:
  - position of the body
  - activity level
  - situation or environment
- you should only change one of these elements at a time
- and do not proceed with further changes until you feel you are skilled at your present practice
- for example, start out by practicing in a sitting position in a nonactive, quiet place, perhaps sitting in your living room
- then proceed to practicing in a sitting position in a nonactive, nonquiet place, perhaps in your living room with your family watching T.V.
- then you can practice while sitting doing something

in a quiet place,e.g. typing in a study

- can you see the steps in the practice?
- you start out sitting, nonactive and quiet
- then you proceed to sitting, nonactive and nonquiet
- next is sitting, active and quiet
- and then sitting, active, nonquiet
- once you have become skilled at this you advance to standing, nonactive in a quiet place, perhaps your living room, and so on
- I have a handout for you that lists these various steps
- do you have any questions about this?
- in todays relaxation session we will be practicing this technique
- I will start by having you take your 2, 4 count breaths
- then I will be instructing you to scan your body for tension and relax the non-essential muscles and reduce the tension in the essential muscles
- we will remain in our seats while we do this
- are there any questions before we proceed?

RELAXATION EXERCISE PRACTICE SESSION

5. Session Summary

A. Self-monitoring

- it is important to strengthen the habit of tuning into your body's warning signals that you are becoming stressed
- it is necessary that you continue to scan your body throughout the day for missed tension
- using mealtimes as a reminder is a good habit to develop
- when you recognize your tension signal stop and assess what is going on
- and decide if you should change the environment, initiate relaxation techniques or both
- at night review your day and write down any new stressful situations and any new reactions to them
- this will help strenghthen the habit of tuning into your body's stress response

B. Differential Relaxation

- this is where you relax nonessential muscles and lower the tension levels of essential ones
- you can relax the muscles through cue-controlled relaxation and relaxation recall
- it takes regular, slow, step-by-step practice to become skilled at this
- are there any questions about this?

7. Homework

- I want you to continue self-monitoring using the format we discussed today
- continue with the daily relaxation practices
- this week I would like you to start practicing without the tape since the aim of this course is for you to be able to relax whenever you wish and not just when you listen to the tape
- practicing without the tape avoids tape dependency
- so use the short exercise and the next day practice without the tape
- then the next day use the tape and the day after no tape, and so on
- practice the differential relaxation in the format we discussed for no more than 5 minutes, 4 times a day
- do not proceed with the next step until you are skilled at the previous one
- remember, this will take several weeks of practice and you must go at your own pace
- you may now also practice your cue-controlled relaxation in moderately stressful situations [NOTE: this is only if the client has been successful in inducing relaxation in mildly stressful ones -if they have not, then, have them continue to practice cue-control in mildly

sressful situations until they are ready to move on]

- are there any questions before we close?

Training Session 6 - Review of training course and final instructions

Overview

1. Structure session
2. Review home practice
3. Review course content
4. Relaxation exercise
5. Session summary

1. Structure session

- can I have your pain chart and relaxation sheet
- today is our last session
- therefore after we have reviewed the home practice we will review everything we have covered in this course
- we will then have a relaxation session
- and close with a final summary and information about what will be expected of you for the remaining weeks of the study

2. Review Home Practice

- lets start with the self-monitoring
- you were to mentally monitor yourselves throughout the day and then review and write down what had been happening to you at the end of the day, how did that go?
- were you able to monitor yourself successfuly with this method?
- were there any new situations that arose during the day, and if so, were you able to remember and note them down during your nightly reveiw?
- do you have any more comments or questions about this before we move on?
- let's talk about the relaxation exercises
- how did the practice sessions go when you were not using the tape?
- are you finding any difficulties with this?
- do you feelconfident enough to practice the relaxation without the tape most of the time now?
- how did the practice of the differential relaxation go?
- did you experience any difficulties with this?
- what stage did you get to in your practice?
- are there any questions about this before we proceed?
- finally, how did it go with practicing your

cue-controlled relaxation in moderately stressful situations?

- did you experience any difficulties with this?
- have you been finding it helpful?
- are you finding that you are more skilled at recognizing the early warning signals of stress and therefore inducing the relaxation response sooner?
- are there any more questions about this?

3. Review course content

- what I intend to do now is review each aspect of relaxation training that we have covered in this course
- because it is the last session, I want you to be very clear about each part we have covered
- therefore if you have any final questions now is the time to ask them

A. Stress

- stress was defined as a complex reaction to a situation that exceeds a persons ability to cope with that situation
- stress results from the interaction between personal factors (how we view the situation, the amount and type of coping skills we have) and environmental factors (how difficult the situation

is, how threatening the situation is to us, etc.)
- when a stressor is encountered, we typically react, handle the situation, and return to normal, with few negative side effects
- this reaction is called transitory stress
- however, if the stressor continues, or if our response system is continually being activated, then our hightened state is maintained and chronic stress is the result
- prolonged stress is harmful as it wears down the body and can result in various forms of physical damage
- medical evidence demonstrates that stress can make the symptoms of any physical illness worse
- because of this relaxation training is now becoming an essential component in the treatment of chronic pain syndromes
- relaxation training has a number of results
- 1. it lowers the physical arousal level during stressful times as well as speeding up the return to a normal state after beeing stressed
- 2. It acts as a distractor from the pain. Distraction has been shown to be a successful technique in decreasing pain
- 3. relaxation gives a person something he/she can do about the pain, and therefore allows some

more personal control over it

- stress is the result of a situational demand and our perception of our ability to cope with that demand
- the demand may be external (noisy children) or internal (worrying about making a speech)
- when a demand occurs we assess our ability to cope with it
- if we feel we can handle the situation stress is either not experienced or decreases as we cope with the demand
- however, if we feel our coping strategies will be ineffective our stress response will continue
- what is a stressor for one person may not be a stressor for another
- the stress response has 3 components; physiological, cognitive, and behavioural
- the 3 components act as an integrated response
- and a change in anyone of them typically leads to a change in the other 2
- everyone reacts to stress in a general way although we each display our own personal pattern of reaction
- our reactions to stress are termed automatic because they just seem to happen
- however over time we have learned what situations

will be stressful for us; this is called conditioning

- because stress is a learned interaction between the environment and our reactions to it we can change and feel less stressed whether or not the environment or other people change

B. Relaxation training in general

- the opposite of the stress response is the relaxation response
- and it is characterized by a decrease in heart rate, respiration rate and muscle tension etc.
- the goal of relaxation training is to develop this physiological response as it is incompatible with the stress response
- this is done by training you to:
  1. induce the relaxation response whenever and wherever you decide to
  2. identify those situations that are generating the stress response in you
- the relaxation exercises are designed to:
  1. teach you the difference between tense and relaxed muscles
  2. condition your body to become relaxed at a certain cue
- it is important to remember that the relaxation response is like learning and maintaining any

other skill

- it needs practice and continued use for it to be effective
- therefore, even though you have learned cue-controlled and differential relaxation, you still need to practice the shorter version (i.e. side 2 of your tape) once a day
- this will not only maintain your skills but be a pleasurable time for you as well as it will be your time to relax
- if you find that your skills are slipping, you will need to go back to the original long version of the relaxation exercise until your skill has returned
- if you have to do this remember that the learning is slow and gradual and each new step is introduced slowly again and only when you have completed the former one
- follow the same format we followed in this course

C. Stress log

- to learn when to induce realaxation means learning to recognize when we are stressed
- there are 2 parts to this learning:
  1. learning what are the initial physical indicators of stress for us
  2. learning which situations are stressful for us

- keeping a stress log helps people clarify this as it gives them more accurate information than trying to remember the situation a couple of days later
- initially the log took a lot of work
- now you are able to scan your body for tension and mentally note the physical symptoms and causative situation
- once a week for the next 6 weeks you should still review and write down any new stressful situations and your reactions to them
- this will strengthen the skill and help you avoid slipping back into old habits
- if you find that you are losing this skill later on, go back to the longer version of the self-monitoring until it is re-established

D. Cue-controlled relaxation

- the goal of relaxation training is for you to become relaxed whenever and wherevever you need to
- one way of doing this is to train your body to become relaxed in response to a self-produced cue
- the 2, 4 count breaths, or your relaxation cue, was placed at the end of the relaxation exercise so that a strong association was built between the cue and the relaxation response
- because of your practice you are now able to relax your body by taking those 2, 4 count

breaths

- the important points to remember in maintaining this association are:
  1. you must reserve your cue only for producing the relaxation response
  2. it must still be repeated at the end of your daily relaxation practice so as to continue the association between your cue and your feeling of relaxation
- when you notice the first physical symptom that you are becoming tense you can use your cue to relax
- you can also use your cue several times during the situation to keep you relaxed
- or you can use it to help you relax back to normal after meeting an unexpected stressor
- if you wish you can use the shorter training version of the relaxation exercise in more demanding situations

E Differential relaxation

- a variety of muscles become tensed during most behaviours
- muscles necessary for the accomplishment of an activity are frequently more tense than they need to be
- and muscles necessary for efficient performance

become tense during the activity

- ideally, in terms of conservation of energy and maintainance of low tension level, only those muscles directly relevant to an activity should be tense
- and they should be tense only to the degree necessary for efficient performance
- in differential relaxation, relaxation is induced and maintained in the muscles not reqired for ongoing activity and excess tension is eliminated from the muscles involved in the activity
- the procedure involves periodic identification of tension during daily activities and the relaxation of those muscles that are unnecessarily tense
- once again, to be able to utilize this technique successfuly it must be practiced
- the practice always includes 3 elements:

  1. position of the body
  2. activity level
  3. situation or environment

- you should only change one of these elements at a time
- and do not proceed with further changes until you feel you are skilled at your present practice
- once again, if you feel that your skill in this

is slipping, then you will need to go back and practice the original initial steps until your skill improves

F. Overall summary

- I have reviewed the principles involved in each technique
- let me review the general main principles as they really cannot be emphasized enough
- relaxation is a learned skill
- like all skills, if you do not use it, you will loose your proficiency at it
- you need to use the relaxation skills continually to maintain their effectiveness
- if you find that you are losing your proficiency at one or more of these techniques, you will have to go back and practice the original steps once again until your skills return
- there are no short cuts in this
- the introduction of these techniques into everyday life is always a slow, step-by-step process
- each new step should be small enough so that success is assured
- and no new step should be taken until the first step is accomplished successfuly several times
- are there any questions or comments about what we

have covered so far?

4. Relaxation exercise

- today I will be leading you through the shorter version of the relaxation exercise, and then we will go into cue-controlled relaxation and finally end with some practice of differntial relaxation
- I want to do this so that you will have a final practice of the techniques that we have learned
- are there any questions before we begin?

RELAXATION EXERCISE PRACTICE SESSION

5. Session summary

- today has been a summary session and so there is not too much more I want to say
- as you were told at the beginning, this study will continue for the same amount of timw as you participated before starting treatment
- I want you to continue keeping your pain charts for that time and give them to me each week
- I will be stting up appointments with you for the final set of testing at the end of that time
- just a reminder that your referring rhematologist

will not be following you again until after that

- it is important that you still continue to practice your relaxation exercises daily

- are there any questions before we close?

APPENDIX G

Long Relaxation Script

I want you to make yourself comfortable. Loosen up any tight clothing and prepare yourself to relax. Just passively listen to my voice. If your mind wanders don't worry about it. Treat your thoughts like clouds in a sunny blue sky .... they drift in and drift out, and then let your mind wander back to the sound of my voice. I want you first of all to begin taking in some deep breaths. Slowly breath in .... and out ..... in .... and out. Like waves on a sea shore that drift in.....and out .... in .... and out. And now I would like you to concentrate on your right hand .... your right hand. When I say tense it I want you to squeeze your hand into a fist and when I say let it go, I want you to let it go immediately. Now tense your right hand .... hold it tight .... feel the tension all the way across the back of the hand .... across the knuckles .... the fingers .... hold it .... feel the sensations of tension .... and now .... let it go .... ease out the muscles across the back of the hand .... around each of the knuckles .... and each of the fingers .... allowing them to assume a comfortable position .... letting the muscles go more and more .... allowing them to relax ..... focus on the difference between tension and relaxation .... letting the muscles go more and more.

Now without tensing any other part of your arm I want you to tense your lower right arm by bending it backwards and pulling your fingers towards you. Feel the tension across the top of the arm .... underneath the arm .... from the wrist to the elbow .... hold it tight .... hold it .... and .... relax .... ease it out .... let the muscles go .... across the top of the arm .... underneath the arm .... smoothing out the muscles where they have been held tight .... allowing them to relax .... from the elbow all the way down to the wrist .... Now, tighten up the upper arm by pushing it in towards your chest .... hold it tight .... feel the tension .... around the top of the arm .... underneath .... all the way from the shoulder to the elbow .... hold it tight .... hold it .... and .... relax .... let it go .... ease out the muscles .... smooth out the muscles across the top of the arm .... underneath the arm .... letting them go more and more .... letting the muscles in your whole right arm become more and more relaxed. Now, I want you to focus your attention on your left arm. Tighten up your left hand by making a fist .... feel the tension across the back of your left hand .... across the knuckles .... and each of your fingers .... hold that tension .... hold it .... and .... relax .... smooth out all the muscles across the back of your hand .... around each of the knuckles and each of your

fingers ..... allow your hand to assume a comfortable position .... allow the muscles to become more and more relaxed .... ease out the tension and focus on the feelings of relaxation in your left hand. Now, tense your left lower arm .... pull your fingers towards you .... feel the tension across the top of your left arm .... underneath the arm .... from the wrist to the elbow .... hold that tension .... hold it .... and relax .... let it go .... ease out the muscles .... let them become more and more relaxed .... smooth them out. Move your attention to your left upper arm. Tense the muscles by pushing your arm in towards your chest .... feel the tension from your shoulder down to your elbow .... across the top of the arm .... underneath your arm .... hold it tight .... hold it .... and .... relax .... let it go .... smooth it out .... across the top .... underneath .... letting the muscles go more and more .... all the way down your left arm. Now focus on your shoulders. Tense your shoulders by pushing them up to your ears .... feel the tension all the way across the shoulders .... hold it tight .... keep the tension .... hold it .... now relax .... let those shoulders go .... smooth out the muscles all the way across the shoulders .... ease them out where you have been holding them tight .... let the muscles go more and more .... allow them to relax more and more. Now tense your neck by

pushing your head into your shoulders .... and now stretch your neck up like a giraffe .... hold it .... feel the tension all the way around the back of the neck .... hold it .... and .... relax .... ease out those muscles .... smooth them out .... ease out those areas where you have been holding tension .... let your neck become more and more relaxed. Move your attention up the back of your head, across the top of your head, and to your forehead. Tense your forehead by either pushing your eyebrows up or by pushing them together .... tense up that forehead .... study what that tension feels like .... hold it .... hold it .... and .... relax .... let it go .... smooth out all those wrinkles .... all those little lines .... ease out those muscles across the entire forehead .... let them become more and more relaxed. Now, close your eyes tightly as though your are protecting them from a sandstorm or a blinding light .... hold them tight .... all the way around the outside of the eye .... the eyelids .... the eye .... hold them tight .... hold it .... and relax .... let them go .... smooth out the muscles around the outside of the eye .... all the little wrinkles .... let the eyelids go .... the muscles of the eye .... ease them out .... let them become more and more relaxed .... focus on what it feels like as you let them go even more. Tense your cheeks now by making the biggest upward smile that you

can .... feel the tension across your cheeks .... hold it tight .... study the tension on the left side and the right .... hold it .... and .... relax .... let the cheeks go .... smooth out the muscles where they have been tight .... ease them out more and more .... on the left side .... and on the right .... relaxing both cheeks. Tense your mouth now by pushing your tongue flat against the top of your mouth .... feel your whole mouth tense up .... your tongue .... the top of your mouth .... hold it .... and .... relax .... let your tongue go .... the back of your mouth .... the roof of your mouth .... let all those muscles go .. . smooth them out .... let your mouth become more relaxed. Now, focus on your jaw and tense it by clenching your teeth .. .feel the tension in your jaw .... hold it tight .... focus on what that tension feels like .... hold it .... and .... relax .... let it go .... loosen up the jaw where you have been holding it tight .... around the back of the jaw .... let it flop loose .... around the joints .... let those muscles go more and more .... as you become more skilled at doing this you will find that your jaw will become so relaxed that your lips will become slightly parted. Focus your attention now on your upper back. I want you to push your shoulder blades together .... tense up that whole upper back .... hold it tight .... feel that tension across the upper

back and shoulder blades .... hold it .... and .... relax .... let the upper back go .... across the shoulder blades .... down the upper back .... ease out all those muscles that you have been holding tight .... let them go more and more .... ease them out. Now focus your attention on your chest and when I start counting take in a deep breath for the count of 4 .... in, 2, 3, 4, hold it .... feel the tension in your chest .... and .... relax .... let it out .... all the way out .... let all those chest muscles go .... it seems that now you can breath more deeply .... that your breath is flowing in and out .... deeply and rhythmically .... in .... and out .... and with each breath you can become more relaxed. Focus on your stomach and tense those muscles by either pulling your stomach in or by pushing out hard against the wall of your stomach .... hold them tight .... no other muscles, just the stomach muscles .... feel the tension all around the stomach .... hold it .... and .... relax .... let those stomach muscles go .... ease them out .... it seems that your breathing is even deeper as your stomach muscles relax and your breath flows in even more deeply .... let those muscles go more and more .... more and more relaxed. Now, move your attention to your right leg and tense up your right thigh by straightening your leg, lifting it a little and pressing down and away from you with your heel .... hold

it tight .... feel the tension all the way down the top of your thigh .... down the back .... from the hip to the knee .... hold it .... hold it .... and .... relax .... let your thigh muscles go .... all the way down the front .... underneath .... ease them out .... let them go .... all the muscles of your right thigh. Tense the muscles of your right calf by bending your foot back and pulling your toes towards you .... feel the tension around the top of your lower leg .... around the calf .... from the knee down to the ankle ... hold it tight .... hold it .... and .... relax .... let the muscles go .... ease them out .... all the way down from the knee to the ankle .... smoothing out the whole right lower leg. Now tense up the right foot by turning the foot inwards and curling up the toes .... feel the tension across the top of the foot .... the ball of the foot .... in each one of the toes .... hold it tight .... feel the tension .... and relax .... let all the muscles go in your foot .... ease out the muscles across the top of the foot .... the ball of your foot .... and in each of your toes .... let them go more and more .... all the muscles in your right leg .... let them go more and more .... more and more relaxed. Move your attention now to your left leg and tense up your left thigh .... hold it tight .... feel the tension across the top of the thigh .... underneath the thigh .... from the hip to the knee

.... hold it .... and .... relax .... ease out all those muscles in the thigh .... underneath the thigh .... on top .... all the way down from the hip to the knee .... let them become more .... and more relaxed. Now tense up your left calf by pulling your toes towards you .... feel the tension across the top of your lower leg .... in the calf .... study the tension in the whole of your left lower leg .... hold it tight .... hold it .... and relax .... let all the muscles go where you have been holding them tight .... ease them out across the top of the lower leg .... let the calf muscles go .... ease out all the muscles from the knee to the ankle .... let them go more and more .... all the way from the knee to the ankle. Focus on your left foot now and tense it by pointing your toes and turning your foot inwards while curling up your toes .... feel the tension across the top of your foot .... around the ball of your foot .... in each of your toes .... hold it tight .... feel the tension .... hold it .... and relax .... ease out all those muscles around the top of the foot .... the ball of the foot .... in each of the toes .... let them go more and more .... all the way from the ankle to the tips of the toes. I am now going to review all the muscle groups that we have covered and if there is still tension in them relax them more as I mention them. The right hand and fingers .... the right lower arm ....the

right upper arm .... the left hand and fingers .... the left lower arm .... and .... upper arm. Across the shoulders .... the neck .... across the back of the head to the forehead .... the eyes .... cheeks .... mouth and tongue .... the jaw .... down to the shoulder blades .... chest .... stomach .... right thigh ....calf .... foot and toes .... the left thigh .... calf .... foot and toes .... Now, repeat silently to yourself after me .... all of my muscles are heavy and warm .... all of my muscles are heavy and relaxed .... all of my muscles are heavy .... warm .... and .... relaxed .... I feel calm .... I feel peaceful .... I feel relaxed .... I feel heavy .... warm .... and relaxed .... my breathing is deep .... deep .... calm .... and relaxed. I want you now to picture yourself floating on a river in a boat .... it's a beautiful day and very peaceful .... your are feeling very safe and comfortable in the boat .... on the river bank are some willow trees .... very gently blowing in the wind .... o the trunks of the trees are numbers from 10 down to 1 .... and you are floating by the tree with the number 10 on it .... I am going to be counting you past the numbers and as you float by each number you are going to become more relaxed .... float past the number 10 .... past 9 ..... more relaxed .... floating by 8 .... feeling calm .... feeling peaceful .... feeling relaxed .... past 7 .... my breathing is

deep .... with each breath out I feel more and more relaxed .... past 6 .... deeper into relaxation .... past 5 .... I feel calm .... I feel peaceful .... I feel relaxed .... more and more relaxed .... past 4 .... floating .... all of my muscles are heavy and warm .... past 3 .... all of my muscles are heavy and relaxed .... past 2 .... I feel calm .... I feel peaceful .... I feel relaxed .... deeper and deeper into relaxation .... floating past 1 .... relaxed .... calm .... peaceful .... You can become as relaxed as you are now by taking 2 breaths in for the count of 4. I want you to breathe in as I count to 4 and breath out to the count of 4 .... In .... 2 .... 3 .... 4 .... and out .... 2 .... 3 .... 4 ..... once again in .... 2 .... 3 .... 4 .... and out .... 2 .... 3 .... 4 .... letting your jaw sag .... letting this deep feeling of relaxation spread down from your jaw to your chin .... up through your face .... across the top of your head .... and into your shoulders .... down through your arms .... and into the tips of your fingers .... down through your body .... and into your legs .... to the tips of your toes .... you can relax anytime you want to .... simply by doing this short 2 breath relaxation exercise .... the 4 count breath in and the 4 count breath out .... and on the second 4 count breath out letting the feeling of relaxation spread from your jaw and chin .... up through

your face .... over the top of your head .... and down through your body to the tips of your toes. I want you to stop picturing the river now, if you still are, and instead I want you to picture a very special relaxation place. It can be a place that you have been to or a place that you have seen or a place of your own imagination. It is a place where you feel safe and relaxed. Picture the colours .... the scenery .... any sounds .... and focus on how peaceful and relaxed you feel there .... this is your special place .... you can go there anytime that you want to relax .... it will always be there waiting for you .... just spend a few moments now resting in that place .... enjoying the relaxed feelings .... feeling peaceful .... feeling calm .... feeling relaxed .... I want you to leave that place now .... it will be there when you wish to return .... stop picturing it and focus once againg on the sound of my voice .... I am going to count from 1 to 5 and as I get closer to 5 you are going to become more alert .... your body will maintain the relaxed state that you feel now but you will have the energy to face the rest of the day .... 1 .... 2 .... you are beginning to feel your feet and hands become more alert .... 3 now you feel it in your arms and legs .... 4 .... your eyelids are beginning to flutter .... and 5 .... fully alert now.

In your own time I want you to stretch .... yawn ....
and very slowly start sitting up.

APPENDIX H

Stress Log

Date & Time	Event	Rating Scale	Symptoms	Comments

APPENDIX I

Short Relaxation Script

I want you to make yourselves comfortable, hands lying peacefully in your lap, your right hand on your left hand. Make sure you are fully supported and that any tight clothing is loosened. It's time for you to relax. Begin by focussing on your breathing, allowing your breath to flow in and out like waves on a sea shore .... flowing in .... and flowing out .... in .... and out .... Now focus your attention on your right hand. Clench your right hand into a fist .... hold it tight .... feel the tension across the knuckles .... across the back of the hand .... and all the way around the front of the hand .... hold it tight .... and relax. Feel the muscles letting go where you have been holding them tight .... relaxation spreading across the back of the hand .... around the front .... and down each one of the fingers .... letting the muscles go more and more .... And now place your right hand on your left hand and allow the relaxation to spread into your left hand .... all the way across the top of the hand .... around the front of the hand .... and down through each of the fingers .... easing out all the muscles in the left hand .... And now, let the relaxation start to spread .... up through both wrists .... up through the forearms .... easing out the

tension .... up into your upper arms .... both of your arms becoming more and more relaxed .... both arms are heavy and warm .... both arms are heavy and relaxed .... the relaxation is now spreading across your shoulders ... as both shoulders become loose and more and more relaxed .... spreading up into the neck .... all the muscles in your neck relaxing .... the tension draining away .... as the relaxation moves up the back of the head .... across all the scalp muscles .... that peacefulfeeling of relaxation spreading down into your forehead .... smoothing out all the tiny wrinkles .... easing out the tension .... relaxing .... calming .... spreading into your eyes .... your eyes become quiet .... your eyelids relax .... your eyes float peacefully in their sockets .... not focussing anywhere but just drifting where they wish .... quiet and peaceful.... the relaxed feeling spreading now down your face .... across your cheeks .... smoothing out all the muscles around your mouth and lips .... relaxing the muscles in your chin and jaw .... letting all the muscles go where you have been holding them tight .... easing them out more and more ....becoming more and more relaxed .... the relaxed feeling now sreading down through your chest .... easing out all the chest muscles .... your breathing becomes deeper and rhythmic .... deeply breathing in .... and .... out .... as your chest muscles become more and

more relaxed Breathing effortlessly . . . as you relax more and more deeply . . . and the relaxation spreading down through your stomach . . . . all the muscles in your abdomen relax . . . . your breathing seems to become even deeper now as the air spreads into your stomach . . . . easing out the muscles even more . . . . your whole body relaxing more and more deeply with every breath . . . the air flowing in . . . and out . . . . more and more peaceful. . . more and more relaxed . . . . and that feeling of deep relaxation now spreading down into your legs . . . . your thighs relax . . . . your calves and shins relax . . . . your legs becming more and more heavy with relaxation . . . the feeling of relaxation spreading down into your ankles . . . . and into your feet . . . spreading along the top of your feet . . . . and underneath to the soles of your feet . . . . and down to the very tips of your toes . . . . your whole body now . . . . so very relaxed . . . . all of your muscles are heavy and relaxed . . . . all of your muscles are heavy and warm . . . . all of your muscles are heavy and relaxed . . . . so very relaxed . . . . . .

Even when you are as relaxed as you are now, there is still extra measure of relaxation that you can achieve . . . . and to help you do that I am going to ask you . to picture yourself floating in a boat along a very

peaceful, quiet river . . . . you are feeling very safe and calm . . . . and being gently carried along the river . . . . its a beautiful day and very peaceful. . on the river bank are some willow trees . . . . very gently blowing in the wind . . . . on the trunk of these trees are numbers from 1 down to 10 . . . . and you are floating by the tree with the number 10 on it . . . . I am going to be counting you past the numbers and as you float by each number you ae going to become more relaxed . . . . float past the number 10 . . . . past 9 . . . . more relaxed . . . . floating by 8 . . . feeling calm . . . . feeling peaceful. . . . feeling relaxed . . . . past 7 . . . . my breathing is deep . . . . with each breath I feel more and more relaxed . . . past 6 . . . . deeper into relaxation . . . . past 5 . . . . I feel calm . . . . I feel peaceful. . . . I feel relaxed . . . . past 4 . . . . more and more relaxed . . . . floating . . . . all of my muscles are heavy and warm . . . . past 3 . . . . all of my muscles are heavy and relaxed . . . . past 2 . . . . I feel calm . . . . I feel peaceful. . . . I feel relaxed . . . . deeper and deeper into relaxation . . . . floating past 1 . . . . relaxed . . . . calm . . . . peaceful .

You can become as relaxed as you are now by taking 2 breaths in for the count of 4. I want you to breath in as I count to 4 and breath out to the count of 4 . . . in

. . . . 2 . . . . 3 . . . . 4 and out . . . . 2 . . . . 3 . . . . 4 and in . . . . 2 . . . . 3 . . . . 4 . . . . . and out . . . . 2 . . . . 3 . . . . 4 . . . . letting your jaw sag . . . . letting this deep feeling of relaxation spread down from your jaw to your chin . . . . up through your face . . . . across the top of your head . . . . down through your neck . . . . and into your shoulders . . . . down through your arms . . . . and into the tips of your fingers . . . . down through your body . . . . and into your legs . . . . to the tips of your toes . . . . anytime you want to relax . . . . you can become as relaxed as you are now . . . simply by doing this short 2 breath relaxation exercise . . . . the 4 count breath in and the 4 count breath out . . . . and on the second 4 count breath out letting the feeling of relaxation spread from your jaw and chin . . . . up through your face . . . over the top of your head . . . . and down through your body to the tips of your toes.

I want you to stop picturing the river now, if you still are, and instead I want you to picture your very special relaxation place . . . . It can be a place you have been to or a place of your own imagination . . . . It is a place where you feel safe and relaxed . . . . picture the colours . . . . the scenery . . . . any sounds . . . . and focus on how peaceful and relaxed you feel there . . . . this is your special place . . . you can go there

anytime you need to relax . . . . it will always be there waiting for you . . . . just spend a few moments now resting in that place . . . . enjoying the relaxed feelings . . . . feeling peaceful . . . . feeling calm . . . . feeling relaxed . . . . I want you to leave that place now . . . . it will always be there when you wish to return . . . . stop picturing it now and focus again on the sound of my voice . . . . I am going to count from 1 to 5 . . . . and as I get closer to 5 you are going to become more alert . . . . and when I reach 5 your body will be fully alert but will maintain the relaxed state you feel now . . . . 1 . . . 2 . . . you are beginning to feel your feet and hands becoming more alert . . . . 3 now you feel it in your arms and legs . . . . 4 . . . . your eyelids are beginning to flutter . . . . and 5 . . . . fully alert now. In your own time I want you to stretch . . . yawn . . . . and very slowly start sitting up.

APPENDIX J

Differential Relaxation Instructions

Differential relaxation practice always includes 3 elements:

-position of the body

-activity level

-situation or environment

You should only change one of these elements at a time

Do not proceed with further changes until you feel you are skilled at the level you are presently practicing

The proceedure is as follows:

- sitting, nonactive, quiet place
- sitting, nonactive, nonquiet place
- sitting, active, quiet place
- sitting, active, nonquiet place
- standing, nonactive, quiet place
- standing, nonactive, nonquiet place
- standing, active, quiet place
- standing, active, nonquiet place

Practice these for no more than 5 minutes, 4 times a day

References

Abel, O., Siebert, W. J., & Earp, R. (1939). Fibrositis. Journal of the Missouri Medical Association, 36, 435-437.

Barrios, B.A., & Shigetomi, C.C. (1979). Coping-skills training for the management of anxiety: A critical review. Behavior Therapy, 10, 491-522.

Bartelt, R.F., & Colon, I. (1982). Implementation of Goal Attainment Scaling in residential treatment: An administrative model. Child Welfare, 61(7), 424-434.

Beetham, W.P. (1979). Diagnosis and management of fibrositis syndrome and psychogenic rheumatism. Medical Clinics of North America, 63, 433-439.

Benson, H.B. (1975). The Relaxation Response. New York: Avon Press.

Benson, H.B., Greenwood, M.M., & Klemchuk, H.P. (1975). The relaxation response: Psychophysiologic apsects and clinical applications. International Journal of Psychiatry in Medicine, 6, 87-98.

Beck,A.T., Ward, C.H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. Archives of General Psychiatry, 4, 561-571.

Blanchard, E.B., & Epstein, L.H. (1978). A biofeedback primer. Reading: Addison-Wesley.

Block, A.R., Kremer, E.F., & Gaylor, M. (1980). Behavioral treatment of chronic pain: The spouse as a discriminative cue for pain behavior. Pain, 9, 243-252.

Budzynski, T.H., & Peffer, K.E. (1980). Biofeedback Training. In I. L. Kutash, L. B. Schleslinger and Associates (Eds.), Handbook on stress and anxiety. San fransico: Jossey-Bass.

Burish, T.G., & Schwartz, D.P. (1980). EMG biofeedback training, and coping with stress. Journal of Psychosomatic Research, 24, 85-96.

Byerly, F.C., & Carlson, W.A. (1982). Comparison amoung inpatients, outpatients, and normals on three self-report depression inventories. Journal of Clinical Psychology, 38(4), 797-804.

Bond, M.R. (1980). Personality and pain. The influence of psychological and environmental factors upon the experience of pain in hospital patients. In S. Lipton (Ed.), Persistant pain: Modern methods of treatment. Vol.2. London: Academic Press.

Byrne, M., Troy, A., Bradley, L. A., Marchisello, P. J., Geisinger, K. F., Vander Heide, L. H., & Prieto, E. J. (1982). Cross-validation of the factor structure of the McGill Pain Questionnaire. Pain, 13, 193-201.

Campbell, S.M., Clark, S., Tindell, E.A., Forehand, M.E., & Bennett, R.M. (1983). Clinical characteristics of fibrositis. I. A "blinded" controlled study of symptoms and tender points. Arthritis and Rheumatism, 26, 817-824.

Cannon, W.B. (1953). Bodily Changes in Pain, Hunger, Fear and Rage. Boston: C.T. Bradford.

Casas, J., Beemsterboer, P., & Clark, G. (1982). A comparison of stress-reduction behavioural counselling and contingent nocturnal EMG feedback for the treatment of bruxism. Behavior Research and Therapy, 20, 9-15.

Cattell, R. B. (1957). Self-Analysis Form. Champaign, Ill.: IPAT.

Cohen, N. H. (1980). The nature of pain. In J. J. Deller (ed.) Proceedings of the Eisenhower Medical Center and the Arthritis Foundation Southern California Chapter, Spring. Rancho Mirage, California: E. M. C. Publishers.

Corson, J.A., Schneider, M.J., Biondi, C.G., & Myers, H.K. (1980). Psychophysiological assessment: Toward a general strategy. American Journal of Clinical Biofeedback, 3, 52-67.

Cox, T. (1978). Stress. New York: Macmillan.

Craig, K. D. (1978). Social modeling influences on pain. In R. A. Sternbach (Ed.) The psychology of pain. New York: Raven Press.

Craig, K. D. (1983). Modeling and social learning in chronic pain. In J. J. Bonica, & D. Albe-Fessard (Eds.), Advances in pain research and therapy, Vol. 5, (pp.813-827). New York: Raven Press.

Craig, K.D. (in press). Emotional aspects of pain. In P.D. Wall and R. Melazack (Eds.), Textbook of Pain. Edinburgh: Churchill/Livingston.

Dohrmann, R. & Laskin, D. (1978). An evaluation of electromyographic biofeedback in the treatment of myofascial pain-dysfunction syndrome. Journal of the American Dental Association, 96, 656-662.

Elek, S.R. (1975). On "the hurry-up disease". Executive Health, 11(9), 1-6.

Everly, G. S. (1981). The nature and treatment of the stress response: A practical guide for clinicians. New York: Plenum.

Fordyce, W.E. (1983). The validity of pain behaviour measurement. In R. Melzack (Ed.), Pain measurement and assessment, pp.145-153. New York: Raven Press.

Fox, E. J., & Melzack, R. (1976). Comparison of transcutaneous electrical stimulation and acupuncture in the treatment of chronic pain. In J. J. Bonica & D. Albe-Fessard (Eds.) Advances in pain research and therapy, Vol I. New York: Raven Press.

Gallagher, E.B. & Wrobel, S. (1982). Sick-role and chronic pain. In R. R. Trunks (Ed.), Chronic Pain: Psychosocial Factors in Rehabilitation. Baltimore: Williams & Wilkins.

Glyn, J. H. (1970). Rheumatic pains: Some concepts and hypotheses. Royal, 354-360.f Medicine: Proceedings, 64.

Gowers, W.R. (1904). Lumbago: its lessons and analogues. British Medical Journal, 1, 117-121.

Graham, W. (1953). The fibrositis syndrome. Bulletin on Rheumatoid Diseases, 3(8), 51-52.

Grzesiak, R. C. (1977). Relaxation techniques in treatment of chronic pain. Archives of Physical Medicine and Rehabilitation, 58, 270-272.

Guzicki, J.A., Coates, T.J., & Goodwin, D.L. (1980). Reductions in anxiety and improvements in teaching associated with cue-controlled relaxation training. Journal of School Psychology, 18, 17-24.

Hench, P.S., & Boland, E.W. (1946). The management of chronic arthritis and other rheumatic disorders amoung soldiers of the U.S. army. Annals of the Rheumatic Diseases, 5, 106-114.

Hersen, M., & Barlow, D.H. (1976). Single-case experimental designs: Strategies for studying behavior change. New York: Pergamon Press.

Hiebert, B. (1980). Self-relaxation: Learn to use it. Coquitlam: Per Man Consultants.

Hiebert, B. (1983). A framework for planning stress control interventions. Canadian Counsellor, 17, 51-61.

Hudson, W.W., & Proctor, E.K. (1977). Assessment of depressive affect in clinical practice. Journal of Consulting and Clinical Psychology, 45, 1206.

Israel, E., & Beiman, I. (1977). Live versus recorded relaxation training: A controlled investigation. Behavior Therapy, 8, 251-254.

Jacobson, E. (1938). Progressive relaxation (2nd Ed.). Chicago: University Press.

Kasl, S.V. (1984). Stress and health. In L. Breslow, J.E. Fielding, & L.B. Lave, (Eds.), Annual review of public health (Vol. 5). Palo Alto: Annual Reviews Inc.

Kazdin, A. E. (1982). Single-case research designs: Methods for clinical and applied settings. New York: Oxford University Press.

Keefe, F. J., Brown, C., Scott, D.S., & Ziesat, H. (1982). Behavioral assessment of chronic pain. In F.J. Keefe & J.A. Blumenthal (Eds.) Assessment strategies in behavioral medicine (pp.321-350). New York: Grune & Stratton.

Kendall, P. C., Finch, A. J. Jr., Auerback, S. M., Hooke, J. F., & Mikulka, P. J. (1976). The state-trait anxiety inventory: A sutematic evaluation. Journal of Consulting and Clinical Psychology, 44, 406-412.

Kiresuk, T.J., & Sherman, R.E. (1968). "Goal Attainment Scaling": A general method for evaluating comprehensive community mental health programs. Community Mental Health Journal, 4, 25-30.

Klinefelter, H.K. (1972). Primary fibrositis and its treatment with pyrazolone derivatives, butazolidin and tandearil. John Hopkins Medical Journal, 130, 300-307.

Kraft, G.H., Johnson, E.W., & Leban, M.M. (1968). The fibrositis syndrome. Archives of Physical Medicine and Rehabilitation, 4, 155-162.

Lazarus, R.S. (1974). Cognitive and coping processes in emotion. In B. Weiner, (Ed.), Cognitive views of human motivation. New York: Academic.

Lehrer, P. M., Schoicket, S., Carrington, P., & Woolfolk, R. L. (1980). Psychophysiological and cognitive responses to stressful stimuli in subjects practicing progressive muscle relaxation and clinically standardized meditation. Behavior Research and Therapy, 18, 293-303.

Leitenberg, H. (1973). The use of single-case methodology in psychotherapy research. Journal of Abnormal Psychology, 82, 87-101.

Linton, S.J. (1982). A critical review of behavioural treatments for chronic benign pain other than headache. British Journal of Clinical Psychology, 21, 321-337.

Lipton, S. (1979). The control of chronic pain. London: Edward Arnold.

Lubin, B. (1967). Manual for the Depression Adjective Checklists. San Diego: Educational and Industrial Testing Service.

Martin, J. & Hiebert, B. (1985). Instructional counseling: A method for counselors. Pittsburg, P.A.: University of Pittsburg Press.

Magnusson, D. (1982). Situational determinants of stress: An interactional perspective. In L. Goldberg & S. Breznitz (Eds.), Handbook of stress: Theoretical and clinical perspectives. New York: The Free Press.

McCarty, D. J., Gatter, R. A., & Phelps, P. (1965). A dolorimeter for quantification of articular tenderness. Arthritis and Rheumatism, 8, 551-559.

Meenan, R.F., Gertman, P.M., & Mason, J.H. (1980). Measuring health status in arthritis. The Arthritis Impact Measurement Scales. Arthritis and Rheumatism, 23, 146-152.

Meichenbaum, D. (1972). Cognitive modifications of test anxious students. Journal of Consulting and Clinical Psychology, 39, 370-380.

Melzack, R. (1975). The McGill pain quetionnaire: major properties and scoring methods. Pain, 1, 277-299.

Melzack, R., & Wall, P.D. (1965). Pain mechanisms: a new theory. Science, 150, 971-979.

Melzack, R., & Wall, P. D. (1982). The challenge of pain. Harmondsworth, Middlesex: Penguin Books.

Merskey, H. (1974). Psychological aspects of pain relief; hypnotherapy;psychotropic drugs. In M. Swerdlow (Ed.), Relief of intractable pain (pp. 90-115). Amsterdam: Excerpta Medica.

Moldofsky, H., & Scarisbrick, P. (1976). Induction of neurasthenic musculoskeletal pain syndrome by selective sleep stage deprivation. Psychosomatic Medicine, 38, 35-44.

Nouwen, A., & Solinger, J. (1979). The effectiveness of EMG biofeedback training in low back pain. Biofeedback and Self-Regulation, 4, 103-111.

Paul, G. L. (1967). Strategy of outcome research in psychotherapy. Journal of Consulting Psychology, 3, 104-118.

Paul, G.L., & Trimble R.W. (1970). Recorded versus live relaxation training and hypnotic suggestion: Comaprative effectiveness fror enducing physiological arousal and inhibiting stress. Behavior Therapy, 1, 285-302.

Philips, C. (1977). The modification of tension headache pain using EMG biofeedback. Behavior Research and Therapy, 15, 119-129.

Prieto, E. J., Hopson, L., Bradley, L. A., Byrne, M., Geisinger, K. F., Midax, D., & Marchisello, P. J. (1980). The language of low back pain: Factor structure of the McGill Pain Questionnaire. Pain, 8, 11-19.

Reading A. E. (1979). The internal structure of the McGill Pain Questionnaire in dysmenorrhoea patients. Pain , 7, 353-358.

Riddick, C., & Meyer, R.G. (1973). The efficacy of automated relaxation training with response contingent feedback. Behavior Therapy, 4, 331-337.

Reynolds, M.D. (1982). The definition of fibrositis. Arthritis and Rheumatism, 25, 1506-1507.

Roy, R. (1984). Pain clinics: Reassessment of objectives and outcomes. Archives of Physical Medicine and Rehabilitation, 65, 448-451

Russell, J.A. (1978). Evidence of convergent validity on the dimension of affect. Journal of Personality and Social Psychology, 36, 1152-1168.

Russell, R.K., Miller, D.E., & June, L.N. (1973). A comparison between group systematic desensitization and cue-controlled relaxation in the treatment of test anxiety. Behavior Therapy, 6, 172-177.

Russel, R.K., Wise, F., & Stratoudakis, J.P. (1976). Treatment of test anxiety by cue-conrolled relaxation and and systematic desensitization. Journal of Counseling Psychology, 23, 563-566.

Selye, H. (1978). The stress of life. New York: McGraw-Hill Book Co.

Shoemaker, J.S., & Tasto, D.L. (1975). The effects of muscle relaxation on blood pressure essential hypertensives. Behavioral Research and Therapy, 13, 29-43.

Simons, D.G. (1976). Muscle pain syndromes - Part II. American Journal of Physical Medicine, 55, 15-42.

Smythe, H. (1979). Nonarticular rheumatism and psychogenic musculoskeletal syndromes. In D.J.McCarty (Ed.), Arthritis and allied conditions (9th ed.). Philadelphia: Lee & Febiger.

Smythe, H.A. (1980). Fibrositis and other diffuse musculoskeletal syndromes. In W.N. Kelly, E.D. Harris, S. Ruddy, & C.B. Sledge (Eds.), Textbook of rheumatology. Philadelphia: W.B. Saunders.

Smythe, H.A. (1981). Fibrositis and other diffuse musculoskeletal syndromes. In W. N. Kelly, E. D. Harris, S. Ruddy, & C. B. Sledge (Eds.), Textbook or rheumatology. Philadelphia: W. B. Saunders.

Smythe, H.A. & Moldofsky, M.D. (1977). Two contributions to understanding the "fibrositis" syndrome. Bulletin on the Rheumatic Diseases, 28(1), 928-931.

Spielberger, C.D. (1968). The state-trait anxiety inventory. Palo Alto: Consulting Psychologists.

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). STAI Manual. Palo Alto: Consulting Psychologists.

Sternbach, R.A. (1974). Pain patients: Traits and treatment. New York: Academic Press.

Sternbach, R. A. (1975). Clinical aspects of pain. In R.A. Sternbach (Ed.), The psychology of pain (pp. 241-264). New York: Raven Press.

Sternbach, R.A., & Timmerman, G. (1975). Personality changes associated with reduction of pain. Pain, 1, 177-181.

Travell, J., Rinzler, S., & Herman, M. (1942). Pain and disability of the shoulder and arm. Journal of the American Medical Association, 120, 417-422.

Varni, J.W. (1981). Self-regulation techniques in management of chronic arthritic pain in hemophilia. Behavior Therapy, 12, 185-194.

Walker, C.E. (1975). Learn to relax: 13 ways to reduce tension. Englewood Cliffs: Prentice Hall.

Watson, C. P. N. (1984). Therapeutic windows for amitriptyline analgesia. Canadian Medical Association Journal, 130, 105.

Wolfe, F. (1984). Tenderpoints, trigger points, and the fibrositis syndrome. Clinical Rheumatology in Practice, Jan/Feb.

Woodford, J. M., & Merskey, F. G. (1972). Some relationships between subjective measures of pain . Journal of Psychosomatic Research, 16, 173-178.

Yunus, M., Masi, A.T., Calabro, J.J., Miller, K.A., & Feigenbaum, S.L. (1981). Primary fibromyalgia (fibrositis): Clinical study of 50 patients with matched normal controls. Arthritis and Rheumatism, 11(1), 151-171.

Zung, W. K. (1965). A self-rating depression scale. Archives of General Psychiatry, 12, 63-70.