PAIN PERCEPTION AND ANXIETY IN PATIENTS WITH FIBROSITIS

by

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Chapter I

INTRODUCTION

Fibrositis is a common rheumatic disorder which has been described and documented in the literature since the mid 1800's. The prevalence of fibrositis in the general population is believed to be significant although few studies have been done documenting the incidence of this disorder. In Great Britain, one-half of all work absenteeism caused by rheumatic disorders is thought to be caused by fibrositis (Ellman, 1942). Many believe that it is no less common in the United States.

Despite the suggested prevalence, little is understood about fibrositis. Patients commonly experience diffuse musculoskeletal pain of nonarticular origin, nonrestorative sleep disturbance and have specific painful trigger points. However, questions still exist regarding the specific emotional and physical characteristics of those patients who suffer from fibrositis.

Further studies need to be done to clarify the emotional and physical characteristics of patients with fibrositis in order to aide in the selection of appropriate treatment. The influence of psychogenic factors in the etiology of fibrositis has not been studied extensively yet fibrositis has been referred to as "psychogenic rheumatism." Studies

examining psychological profiles of fibrositis patients need to be done in order to determine the role they play in the pain from which these patients suffer. Specifically, the psychological variable of anxiety and its role in fibrositis needs to be examined. In a recent study, seventy percent of fibrositis patients stated they were anxious (Yunus et al., 1981). However, this was measured by subjective responses only. Validated measuring tools of anxiety levels need to be used to obtain objective data in establishing a relationship between anxiety and fibrositis.

Anxiety has also been found to be an integral factor in a person's perception of pain (Bobey & Davidson, 1970). Since fibrositis has been called a "pain amplification syndrome" by Smythe, the question is raised as to whether pain perception in people with fibrositis may be different than in people without fibrositis. Descriptive, correlational research needs to be done in order to determine the role pain perception plays with these patients.

The purpose of this study was to measure anxiety and pain perception in patients with fibrositis and in those without fibrositis to determine if these two factors differ in the fibrositis population. The goal was to gather information which would aide in further understanding the pain associated with fibrositis leading to appropriate treatment.

Review of Literature

The literature to be reviewed consists of research information on fibrositis and from studies on pain perception and anxiety. Previous research done relating the concepts will also be discussed.

Fibrositis. Although believed to be noninflammatory, the name fibrositis implies an inflammatory process of the fibroconnective tissues (Bennett, 1981). Other terms commonly used for the same condition are "myofascial pain syndrome," "myofascitis," "fibromyositis," and "nonarticular rheumatism." References to fibrositis were first made in the nineteenth century by the German physician Froriep. Froriep described painful hard places in the muscles of 148 rheumatic patients and named the finding "muscle callus" (Simons, 1975).

After that time, other German physicians studied and documented findings of hard nodules existing in fibrous connective tissues. At the same time, however, many internists and surgeons continued to deny the existence of fiber hardenings. This was due in large part to the inconsistent reports of pain related to nodules, biopsies showing normal muscle tissue and confusion about the cause of muscle hardness. Thus the controversy over fibrositis began.

An English physician named Gowers first introduced the term "fibrositis" in 1904 by referring to muscular fibrositis of the arm (Bennett, 1981). He described the condition as acute or chronic and usually an asymmetrical inflammation of

the muscles aggravated by exposure to cold and overstrain. Gowers did not mention any palpable findings nor did he provide any pathological verification of inflammatory processes (Simons, 1975).

In the same year another English professor of medicine, Stockman, reported findings of fibrous irritations in his patients (Simons, 1975). He reported similar symptoms as Gowers. Specifically, stiffness, aching, and acute pain aggravated by cold, damp weather and overexertion. Biopsies taken from fibrous indurations were reported by Stockman to show inflammatory hyperplasia and fibroblastic proliferation (Kraft et al., 1968).

A book entitled "Fibrositis" was written by Lwellyn and Jones in 1916 (Bennett, 1981). These authors defined "myo-fibrositis" as an acute or chronic inflammatory change in the interstitial fibrous tissue of a striated or voluntary muscle. They stated that pressure painful nodules may or may not be present. Although they did not do any pathological studies of their own, the authors supported the concept of inflammatory changes of fibrous tissue based on the past findings of the German physicians and Stockman's work (Simons, 1975).

In 1939, a study was conducted by Abel, Siebert and Earp from an arthritis clinic in Missouri which failed to confirm inflammatory changes found in muscle biopsies (Bennett, 1981). They also reported normal laboratory findings in their

fibrositis patients. The authors did find similar presenting complaints of muscular pain, stiffness and exhaustion that Gowers, Stockman, Lwellyn and Jones had all documented (Simons, 1975).

Collins and Slocumb of the Mayo Clinic biopsied fibrositic muscle and also found negative results (Simons, 1975). Thus the concept of inflammatory changes of fibrous muscles was again disputed.

Elliott did an EMG study in 1944 which suggested that fibrositis nodules were the results of muscle spasm (Elliott, 1944). He tested fourteen patients with sciatica and found that the eight patients who had local tenderness experienced increased irritability and continuous discharge with the insertion of the needle electrode. From the results, Elliott summized that the EMG activity represented voluntary spasm of small groups of muscle fibers and that this spasm was the source of pain and tenderness in fibrositis. He postulated that sustained contraction of part of a muscle would lead to increased irritability, pain sensitivity and eventually pathological changes (Simons, 1975).

In 1946, Kelly presented a paper on fibrositis describing myalgic lesions and their secondary effects (Kelly, 1946). He supported the concept of muscle spasm by demonstrating that injecting primary myalgic spots with procaine offered temporary relief where injecting areas of referred pain only aggravated the symptoms. Thus he concluded the

fibrositic syndrome consisted of a localized myalgic lesion which resulted in widespread reflex effects (Kelly, 1946). However, only forty percent of the patients injected with procaine received any relief. The total number of patients injected was not given.

The concept of muscle spasm was disputed in 1968 by Kraft, Johnson and Laban. From an EMG study of twenty-nine patients, they concluded palpable nodules were not caused by muscle spasm because the areas on the nodules were electrically silent (Kraft et al., 1968). They defined a "fibrositis syndrome" which consists of four essential features: positive "jump" sign over point tenderness areas; "ropy" or palpable muscle; demographia; and reduction of pain with ethyl chloride spray.

Another hypothesis about the etiology of painful areas in fibrositis was made by Copeman and Ackerman in 1944. The authors dissected the backs of fourteen patients who had suffered with fibrositis of the back prior to death and found no fibrous lesions or inflammatory reactions. They did find abnormalities in the fat pattern around the painful areas showing fat herniation and pedunculation. The authors also identified fifty consecutive pressure sensitive areas associated with low back pain symptoms that were located within the fat distribution. Further studies have failed to verify their findings.

More recent studies have examined the relationship

between sleep disturbance and fibrositis. Modofsky and colleagues did two studies which showed a specific pattern of EEG sleep disturbance and musculoskeletal pain in both fibrositis and healthy subjects who were deprived of stage 4 sleep (Modofsky et al., 1975). In the first, they measured musculoskeletal tenderness, subject's mood and EEG sleep patterns in ten patients with fibrositis. The results found seven of the patients to have a nonREM sleep disturbance.

Moldofsky further explored studying six healthy subjects who underwent three nights of stage 4 or nonREM sleep disturbance. The results found all the subjects to have an increase in muscle tenderness as measured with a dolorimeter and subjective complaints of somatic fatigue during the deprivation period as compared to pre and post deprivation scores. The authors concluded that with the impairment of the restorative function of nonREM sleep there is the onset of fatique and musculoskeletal pain which are all common presenting complaints of fibrositis patients. This leads one into a self-pereptuating cycle and they propose the treatment should be aimed at restoring normal sleep patterns (Modofsky et al., 1975). Further studies in this area are currently being done.

While the underlying etiology remains controversial, there is agreement among authors today on the common physical characteristics of fibrositis and criteria for diagnosis. The history will include ill-defined musculoskeletal pain which can vary in location and is aggravated by fatigue,

weather changes, stress, noise and unaccustomed exercise (Bennett, 1981; Smythe, 1979). Morning stiffness and chronic fatigue are also common.

Diagnostic guidelines of examination findings have also been suggested. Classically the existence of painful trigger points or tender spots is always present. There are many identified points that are located over muscle and ligamentous bony insertions and are often tender in healthy persons but not painful as they are in fibrositis (Bennett, 1981; see Appendix A). Accepted diagnostic criteria of fibrositis includes tenderness and pain in at least twelve of the sites (Smythe, 1979). There is also skin fold tenderness over the upper scapular region which is often accompanied by reactive hyperemia found upon examination. Normal findings of the examination on a person with primary fibrositis include normal joints, normal muscle mass and strength, normal ESR, SGOT, muscle enzymes, RF, ANA and x-rays (Simons, 1975; Bennett, 1981; Smythe, 1979).

Fibrositis commonly exists in conjunction with other diseases and is then called secondary fibrositis. Nineteen associated diseases in patients with fibrositis were identified in 1968 (Kraft, Johnson, & LaBan, 1968). Bennett states that diseases which predispose patients to fibrositis are those that have fatigue as a prominent manifestation such as rheumatoid arthritis, viral hepatitis, influenza and hypothyroidism (Bennett, 1981). Smythe states that when

secondary fibrositis exists with an associated disease the fibrositis mechanisms amplify the pain of the primary disorder (Smythe, 1979).

This pain amplification concept leads to the question of the role pain perception may have in fibrositis. It is known that pain is one of the primary components of fibrositis. However, little is known about the role pain perception may be involved in the symptoms of fibrositis patients and the contribution they may have to their pain.

Anxiety is believed to be an integral factor in one's perception of pain. Further research is needed in pain perception and anxiety in this population. The question is therefore raised as to whether or not pain perception may differ in patients who have fibrositis from those who do not. If differences in these two variables exist with fibrositis then this would contribute to better understanding of this pain component.

Pain Perception. Pain is a concept scientists are constantly trying to define and quantify. Many have added to the definition of pain. Sternbach defines pain as "an abstract concept which refers to a personal, private sensation of hurt; a harmful stimulus which signals current or impending tissue damage; and/or a pattern of responses which operate to protect the organism from harm" (Sternbach, 1968). Another author describes pain as an unpleasant experience which we primarily associate with tissue damage

or describe in terms of tissue damage or both (Merskey, 1964). Beecher defines pain as consisting of two components, a primary sensory component and a reaction component (Beecher, 1959).

One difficulty in defining pain is that it is a subjective sensation which is not directly communicable to another. One can only transmit behavior, not sensations. Pain as a response can be either verbal, overt bodily responses, physiological or neurological. Another difficulty in defining pain is that individuals react to and feel pain differently.

In an attempt to define and measure pain three pain response parameters have been identified. The widely accepted parameters are pain threshold, pain tolerance and pain sensitivity range. They are used to measure one's pain perception which is how an individual perceives pain. Specifically, they may be defined as follows:

1. Pain threshold is the point at which pain is first perceived by the individual.

2. Pain tolerance is the point at which the individual will withdraw from or terminate the noxious stimulation.

3. Pain sensitivity range is the difference between pain tolerance and pain threshold.

Pain perception has been defined as a highly personal experience depending on cultural learning, the meaning of the situation and other factors that are unique to each

individual (Melzack, 1973). Cultural values, age and sex are all variables which are thought to influence how a person perceives and reacts to pain. In a review article, several studies are cited which attempt to establish effects these variables have (Langley & Wolffe, 1967).

In 1944, Chapman and Jones measured pain responses in eighteen Negroes and eighteen Americans of European ancestry matched for age and race. Age range of the subjects was ten through eighty-five years. The authors used a radiant heat technique to elicit cutaneous pain and then measured the pain parameters. Age and sex were both shown to affect pain perception. The results showed the Negro group had a lower pain threshold (mean 0.268) than the American group (mean 0.318) and lower pain tolerance (mean 0.301) than the American group (mean 0.384). It was also found that pain threshold decreased with age in both groups as the average pain threshold for the 10-22 year group was 0.289 gm.cal. per second per cm. and it was 0.347 gm.cal. per second per cm. for the 45-83 year group (Chapman & Jones, 1944). Statistical significance of the results was not given.

Merskey and Spear did a study in 1964 comparing pain responses in 28 white male medical students and 11 Afro-Asian male medical students. They used a pressure algometer on the forehead and tibia to elicit pain in the subjects. They reported no statistical difference in pain threshold or pain tolerance between the two male groups (Merskey &

Spear, 1964). The authors then compared the two male medical groups with a group of 10 white female medical students and a group of 20 white male non-medical students. Using the same methods, the females were found to have a lower pain threshold than the white male medical students ($p < 0.001$) and the white male non-medical students ($p < 0.05$). Pain tolerance was also lower for the females than the male medical students ($p < 0.01$) and the male Afro-Asian medical students ($p < 0.05$) (Merskey & Spear, 1964).

In a nonexperimental study, Winsberg and Greenlick studied responses to pain of childbirth in 365 lower-middle class Negro and white mothers. Pain responses were evaluated by the delivery room staff for each patient after the delivery and through a patient questionnaire in which patients were asked to evaluate the intensity of their pain experience. There were 207 white mothers and 158 Negro mothers. Mean score values showed no difference between Negro and white mother's pain response. Statistical significance was not given (Winsberg & Greenlick, 1967).

Another nonexperimental study was done in 1952 by Zoborowski. He compared pain expression behaviors of four ethnocultural groups. The subjects included thirty-one Jewish, twenty-four Italian, eleven Irish and twenty-six "Old-American" descendants at the Kingsbridge Veteran's Hospital. All subjects were male. By interview, observation of pain behaviors and subjective reports from the hospital staff he concluded differences in pain reactions

between the groups. Zoborowski reported that Jewish patients tended to provoke worry from others, the Italians tended to provoke sympathy and the Old Americans withdrew socially when in pain (Zoborowski, 1952). He did not measure pain threshold or tolerance and his conclusions are highly subjective.

A study was done by Sternbach and Turskey in 1965 that compared four ethnic groups of women and their pain responses. The subjects were housewives, fifteen in each group. The authors elicited pain with electric shock and measured pain tolerances. The British protestant group was found to have the highest pain tolerance followed by the Jewish group, Irish group and the Italian group with the lowest pain tolerance. Statistical difference for all groups was reported at $p < 0.05$ (Sternbach & Turskey, 1965). They reported no significant difference between the groups for the physical variables of age, height or weight.

Woodrow and colleagues studied the effect of age, sex and race on pain responses. Their subjects included 41,119 whites, Negroes and Orientals varying in ages from twenty to over seventy. They used a pressure tolerance test to elicit pain by applying mechanical pressure on the Achilles tendon. The results of age differences were based on 56% of the subjects and pain tolerance was reported to decrease with increasing age for both sexes. Men were reported to tolerate more pain than women with the mean pain tolerance

of all men being 28.7 lbs/sq. inch and the mean for women being 15.9 lbs/sq. inch. Whites showed the highest average pain tolerance (males 29.2, females 26.5 lbs/sq. inch). Negroes were second (male 26.5, female 15.2 lbs./sq. inch) and the Orientals had the lowest pain tolerance (male 24.3, female 14.4 lbs./sq. inch). All differences between racial groups were reported to be significant at $p < 0.001$ and both race and age differences in pain tolerance were more marked in men than in women (Woodrow et al., 1972).

Where age, sex and cultural values are believed to influence pain responses the literature reported uses a variety of methods to elicit pain, various patient populations and thus conflicting reports exist. Beecher names several studies that deny differences in pain responses between age and sex which include Hardy, Wolffe and Goodell, 1952, and Swartz, 1951 (Beecher, 1959). This raises the question of other variables that may influence how one perceives pain and leads to the area of the psychological aspects of pain.

Sternbach describes the complaint of pain as an end product of many processes reflecting psychological as well as physical pathology (Sternbach, 1977). In reviewing different methods for measuring pain, Merskey states that pain tolerance is associated more with the psychological state of the individual where pain threshold seems to be effected more by physiological determinants (Merskey, 1973).

Pain responses are thought to be effected by an individual's past experiences with pain and the associations one draws from the past experiences. Melzack did a study with Scottish terriers, raising them from infancy in an isolated environment free of pain experiences. When the dogs reached adulthood they did not show a painful response when exposed to a flaming match (Melzack, 1961). He attributes this to the dogs' lack of painful experience while growing up.

Engel has identified five meanings of pain an individual acquires through life experiences (Engel, 1959). These are body pain from the environment; pain and nurturance from infancy; pain and punishment from childhood; pain associated with aggression and power; and pain related to the loss of a loved one. It is proposed that all of the experiences related to these events will effect how an individual perceives and responds to pain. Through case studies, Engels stated that the four most common psychodynamic features in pain patients are conversion hysteria, depression, hypochondriasis and paranoid schizophrenia (Engels, 1959). Specific number of patients interviewed and diagnostic criteria used are not given.

Blumer throughout a ten year period studied 234 patients with chronic pain to determine any psychological differences existing in patients with pain (Blumer, 1978). His subjects included 149 females and 85 males with the average age of fifty years and length of pain averaging 7.2 years. Each

subject completed a pain questionnaire consisting of subjective reports of illness, family relations, emotional stability and activities. The subjects then completed a battery of psychological profiles tests and were then interviewed by a psychiatrist. The results of the psychological tests were compared to a control group of 4117 subjects without pain. The pain population was found to have higher scores on neuroticism, dependency and anxiety scales than did the control group. Specific scores were not given but were reported to be statistically different from the control subjects (Blumer, 1978).

The previous study examined patients with chronic pain however, distinctions between psychological aspects of acute and chronic pain have been made. Sternbach states that acute pain is almost always accompanied by anxiety while depression results from chronic pain (Sternbach, 1975). In a 1973 study by Sternbach and colleagues, 117 low back pain patients were given the MMPI to determine psychological profiles. Hypochondriasis, Depression, and Hysteria scales were found to be two standard deviations above the normal mean (Sternbach et al., 1973). The subjects included fifty-seven men and sixty women and when compared, men were more depressed ($p < .05$) more angry ($p < .05$) and more anxious ($p < .05$) than women. The MMPI profiles were also compared between nineteen acute pain patients (pain less than six months duration) and ninety-eight chronic pain

patients. The chronic pain group was found to have higher Hysteria, Depression and Hypochrondriasis scales (Hs $p < .05$; Dp $p < .01$; Hy $p < .01$). The authors concluded that the acute patients showed less somatic concern but their body preoccupation and hypomanic reaction-formation served to mask the depression which is evident in chronic pain patients (Sternbach et al., 1973).

Woodforde and Merskey studied psychological profiles for patients with both organic and non-organic pain. A total of forty-three patients, twenty-seven in the organic group and sixteen in the psychiatric group (non-organic pain), were given the Middlesex Hospital Questionnaire and Eysenck Personality Inventory. When compared to corresponding profiles of "normals" and "psychiatric" outpatients, they found both pain groups resembled the "psychiatric" outpatients. Also, the organic group of patients were as neurotic as the psychiatric group (non-organic) as no significant statistical difference was found between the two groups (Woodforde & Merskey, 1972). They concluded from their results that the effect of chronic pain is to cause emotional distrubance regardless of whether the pain is organically caused. The concept of neuroticism leads to the area of anxiety and its effect on pain perception.

Anxiety and Pain Perception. The reaction component of the pain response is effected by the meaning of the experience to the individual and the anxiety over the

consequences (Beecher, 1959). The pain experienced is relative to the intensity and the threat present. Anxiety has been said to be the single most important factor in the reaction component of pain (Sternbach, 1968). Pain tolerance has been found to be increased by reducing anxiety or decreased by increasing anxiety (Sternbach, 1975). Several studies examining the relationship between anxiety and pain perception have been done.

Lynn and Eysenck did a study in 1961 testing the effect of neuroticism on pain perception. Thirty university students were divided into three groups of ten according to their extraversion scores. Extraversion and neuroticism were determined by the Maudsley Personality Inventory and the Rotating Spiral After-Effect Test. Pain tolerance was measured by subject's reaction to heat stimulation by a thermo-stimulator. The results showed that pain tolerance was lower with higher neuroticism scores ($p = .01$) and higher with higher extraversion scores ($p = .01$). The authors hypothesized that extraverts would have less anxiety over their pain experience than neurotics thus a higher pain tolerance (Lynn & Eysenck, 1961).

In a similar study, Shiomi looked at the relationship between pain threshold and pain tolerance with extraversion and anxiety factors. His subjects included twenty-eight males and twenty-eight female undergraduate students. Pain was elicited by having subjects immerse both hands into

three degree celcius water. Pain threshold and pain tolerance were measured for each subject. The Maudsley Personality Inventory and the Manifest Anxiety Scale were used to determine the degree of extraversion and neuroticism of each subject. The results showed significant negative correlations between pain threshhold and neuroticism ($p < .01$) and a positive correlation between pain tolerance and extraversion though not at the significant level (Shomi, 1978).

A study by Morgan and Horstman also found the psychological traits of extraversion, neuroticism and anxiety to correlate with pain perception. The subjects included twenty adult males that were tested two separate times to establish test-retest reliability. The pain stimulus consisted of applying pressure to the left fore-finger by a pain stimulator and pain responsitivity was measured. The State-Trait Anxiety Inventory, Somatic Perception Questionnaire, Profile of Mood States, Eysenck Personality Inventory, Depression Adjective Checklist and the Embedded Figures Tests were administered to measure psychological state and traits. A stepwise multiple regression analysis of the data showed that psychological traits of extraversion ($p < .05$), field dependency ($p < .01$), and trait anxiety ($p < .01$) as well as psychological states of depression ($p < .01$) and vigor ($p < .01$) correlated inversely with the perception of pain (Morgan & Horstman, 1978).

Elton and colleagues studied the role of augmentation-

reduction in pain tolerance and pain threshold using Petrie's classification of subjects into augmenters and reducers. The hypothesis was that reducers are synonomous to extraverts where augmenters are to introverts in relation to pain tolerance. Twenty-eight college students were divided into two groups of fourteen each according to their scores on Petrie's test, highest scorers being augmenters and the lower scores reducers. Spielberger's anxiety trait and state scales were also used. Pain was elicited by a sphygmomanometer and pain threshold and tolerance were measured. No significant correlation was found between augmentation and reduction groups. However, trait anxiety yielded significant correlations with both pain threshold and pain tolerance (r 2.31) where state anxiety was non-significant (Elton et al., 1978). Where the study failed to support Petrie's augmentation-reduction hypothesis as a personality variable in the pain response, the authors did feel they supported Eysenck's neuroticism variable by the trait anxiety relationship with pain tolerance.

Based on the assumption that anxiety is one of the integral factors in a person's pain response and that pain is a stressor producing anxiety, Bobey and Davidson did a study looking at stress reduction techniques to alter anxiety and therefore increase pain tolerance. They used eighty female nursing students and divided them into four groups (control, relaxation, anxiety and cognitive rehearsal).

A radiant heat apparatus and pressure algometer were used to produce pain and pain tolerance was measured for each. The relaxation group listened to a relaxation exercise tape, the anxiety group listened to a recording of women in labor, the cognitive rehearsal group heard a tape of descriptions of the pain stimulator procedure and the control group heard a tape on study habits. Pain stimulation followed the tape sessions. The results showed a significant difference ($p < .001$) between the four groups. The relaxation group had the highest pain tolerance scores, anxiety and cognitive rehearsal groups were next and the control group had the lowest pain tolerance (Bobey & Davidson, 1970). Thus the authors concluded that lowering anxiety with relaxation served to increase pain tolerance.

A few studies have been done with fibrositis patients in reference to specific psychological findings. Ellman and colleagues in 1942 examined fifty patients diagnosed as having fibrositis. The subjects age ranged from nineteen to sixty-one yearswith duration of pain ranging from three months to forty years. All patients complained of pain and stiffness and twenty patients had weakness. All the patients underwent a physical and psychiatric exam. The results of the psychiatric examinations showed thirty-five of the patients suffered from psychological disorders. Twenty-five of these patients were diagnosed as hysterical conditions and seven as anxiety states. Depression and character disorders accounted for the other patients (Ellman et al., 1942).

The patients with the psychological disorders had no organic causes for their pain thus the authors thought the pain to be psychogenic in nature. Their criteria for diagnosing fibrositis weredifferent than the accepted diagnosis criteria used today thus the generalizability of the results is limited.

A more recent study by Yunus and colleagues examined fifty patients with primary fibrositis. Seventy percent of the patients admitted to being anxious and in sixty-eight percent symptoms were made worse by anxiety per subjective report (Yunus et al., 1981). Anxiety did not always correlate with subjective complaints of stiffness, numbness, fatigue or swelling. The authors state that anxiety is an important factor in primary fibrositis but unlike psychogenic rheumatism evidence of emotional disturbance is not always present (Yunus et al., 1981). Actual anxiety traits of the fibrositis patients were not measured as the authors used subjective reports to document the incidences. Pain perception in fibrositis patients have not been studied thus the relationship between anxiety and pain perception in this population is unknown.

Conceptual Framework

Throughout the literature on fibrositis, pain has been a consistent feature of this disorder. Past research done has focused primarily on finding a cause for fibrositis looking at various organic changes which may be responsible

for this pain complaint. When no organic cause could be found in earlier studies this pain was frequently labeled as "psychogenic." However, psychological characteristics of fibrositis patients have not been studied extensively so this term is inadequately supported. The research on fibrositis has been helpful in establishing diagnostic criteria and common physical findings. The area lacking study is in the psychological parameters specific to fibrositis leaving questions regarding its influence especially on this pain component.

Several authors have suggested that patients with fibrositis have an enhanced pain perception. Elliott felt that as the result of sustained muscle spasm these patients had an increased pain sensitivity (Elliott, 1944). Bennett states that the non-REM sleep disturbance associated with fibrositis may be responsible for enhancing pain perception in these patients thus increasing their pain (Bennett, 1981). Smythe alludes to the idea of an increased pain perception by referring to fibrositis as a pain amplification syndrome (Smythe, 1979). He does not correlate this to a specific causative factor.

The pain perception literature has shown that pain is a very subjective phenomenon which can vary among individuals and be influenced by a number of factors. The research done looking at age, sex and cultural differences is inconsistent in its findings so definite relationships between these

variables and pain perception can not be drawn. Past experiences and psychological characteristics of an individual have been documented more consistently as influencing factors in one's pain perception and pain experience. Patients with both acute and chronic pain of either organic or non-organic origin have been said to have abnormal psychological profiles. A specific psychological variable of anxiety, also measured in the form of neuroticism and hysteria, has been shown to be prevalent in patients with pain.

Anxiety has also been shown by many studies to influence pain perception. Past research has demonstrated that raising one's anxiety level lowers a person's pain tolerance and threshold. Thus it can be said that anxiety has a negative relationship with pain perception. A few authors have alluded to patients with fibrositis being more anxious than people without fibrositis. However, studies using validated measurements for anxiety have not been done nor has anxiety been correlated with pain perception in this patient population. Perhaps then, the pain amplification of fibrositis is due to an increase in anxiety in this population which lowers pain tolerance thus increasing the amount of pain experienced.

The assumptions of this study are based on the literature and are as follows:

1. Pain perception can be measured by pain threshold and pain tolerance.

2. A lower pain tolerance and pain threshold is indicative of a higher amount of pain being experienced by a person.

Hypotheses

The specific hypotheses tested were 1) patients with fibrositis have higher anxiety levels than patients without fibrositis; 2) patients with fibrositis have an enhanced pain perception (decreased pain threshold and tolerance) when compared to patients without fibrositis.

The operational definitions for the study were the following:

1. fibrositis - a rheumatic disorder characterized by symptomatic complaints of pain, stiffness, fatigue, sleep disturbance and trigger points.

2. pain threshold - the point at which painful stimulus is first perceived.

3. pain tolerance - the point at which maximal pain is elicited and the individual withdraws from the stimulus.

4. state anxiety - a transitory state of anxiety that fluctuates over time and is influenced by the situation and individual responses.

5. trait anxiety - a personality trait of anxiety-proneness of an individual that remains relatively stable over time.

The implications for nursing of this study are that nurses will often be the ones evaluating a fibrositis patient's pain. If higher anxiety levels are found to correlate with

pain perception in this population then nursing interventions would include techniques directed at reducing anxiety. Patient education would consist of helping the patient with fibrositis identify feelings of anxiety, possible causes for the feelings and ways to reduce the anxiety. A second purpose of the study is to help nurses be aware of this common rheumatic disorder and recognize fibrositis as requiring specific nursing attention.

Chapter II

METHODS

The study design was a non-experimental, descriptive and comparative study. No manipulation of the variables was performed. This study was part of a larger survey study being done to document the incidence and psychological characteristics of fibrositis patients.

Setting

The setting for obtaining the sample was in the General Medicine and Medicine Subspecialty Outpatient Clinics (excluding rheumatology) of a university teaching hospital. This setting was chosen for its availability of subjects and also to document the incidence of this disorder in a non-rheumatology, ambulatory patient population. Examinations of study participants were also performed in the clinic area as it was familiar to the subjects.

Subjects

Subject selection was done by asking all patients in the specified clinic area to fill out Questionnaire I (Appendix B). At the same time, patient consent was obtained (Consent Form I, Appendix C). Questionnaires were then scored. Patients who answered questions 7 or 9, 8 or 10 and

two of questions 1, 11, 12, 13, 14, 15 with "often" or "almost always" and question 3 with "almost never" or "sometimes" were defined as possible fibrositis. Others were defined as not fibrositis. All subjects identified as possible fibrositis were asked to return for a second visit as were an equal number of control subjects matched for age, sex and race. Criteria for inclusion were that subjects be able to read English so that they could answer the questionnaires and willingness to participate in the study. Potential sample size included all patients seen in the outpatient clinics from September 1981 through February 1982.

Data Producing Instruments

Data producing instruments used in the study were the dolorimeter and the State-Trait Anxiety Inventory. The dolorimeter was used to measure pain threshold and pain tolerance of each subject. (Appendix H). The dolorimeter is a spring loaded 1-10 kg pressure guage which is similar to the pressure algometer in that exact pressure can be elicited and measured. The dolorimeter has been used and reported extensively in the research literature (Gluzek, 1944; Keele, 1954; McCarty, 1965). An additional advantage in using this tool was that it was the instrument used in the study to assess the presence of positive trigger points of fibrositis. Therefore, the measuring of pain perception was consistent with other components of the physical examination.

The Spielberger State-Trait Anxiety Inventory consists of forty self-report questions measuring A-State, a transitory state of anxiety (questions 1-20) and A-Trait, the tendency one has to respond to situations perceived as threatening with increase in anxiety state. (Appendix I). This tool was chosen because of its high internal consistency (.83 to .92) and because the Inventory possesses both concurrent and construct validity (Spielberger et al., 1970). Scores range between twenty and eighty for both A-State and A-Trait scales with the higher scores indicating higher levels of anxiety.

Methods of Procedure

All patients with criteria specific for fibrositis as determined by the initial questionnaire and the matched control group were requested by letter (Appendix D) to return for a second visit. Patient's consent was obtained prior to participation (Consent Form II, Appendix E). Two investigators conducted the data collection. Questionnaire II was administered and recorded by investigator 1 and dealt with subjective complaints (Appendix F). A physical examination of trigger points, skin fold tenderness and reactive hypermia was performed by investigator 2 (Appendix G). Investigator 2, doing the physical examination, did not know the results of the patient's subjective reports and therefore did not know whether the subject was possible fibrositis or in the control group. Subjects were also asked to

answer the SCL-90-R psychological test and the Beck Depression Inventory as part of the larger study. Subjects were randomly assigned by flip of a coin whether they completed the psychological questionnaires first or had the examination first in order to remove any bias that the order of events may have had on the results.

Pain Perception. Specific to this study was the measurements of pain perception and anxiety of each subject. During the physical examination, the dolorimeter was used to measure pain perception. The suggested sites to elicit pain and measure responses were the shin, forehead, and thumb (Keele, 1954; Davidson & McDougall, 1969; Woodforde & Merskey, 1971). All three of these sites were tested and recorded in kilograms.

Subjects were instructed to notify the examiner by stating "now" when they initially felt a sensation of pain. The reading of kilogram indicated on the dolorimeter was then recorded as the measurement of pain threshold.

The subjects were given additional instructions that once they had indicated the beginning of feeling a sensation of pain, the examiner would continue to exert pressure until the subjects found the pain too unpleasant to continue. The measurement, pain tolerance, was therefore determined by the subjective and/or objective signs (flinching) indicating the desire to terminate the pressure.

Amount of pressure exerted to elicit these two responses was then recorded. All subjects were tested in the morning

and with the same dolorimeter to ensure constancy of conditions.

Anxiety. All subjects were asked to answer the State-Trait Anxiety Inventory when completing the SCL-90-R and Beck Depression Inventory. Both A-State and A-Trait scores were obtained for each subject.

Protection of Human Subjects

Consent for all aspects of the study was obtained for each subject. Participation was voluntary and subjects had the right to withdraw from or refuse to participate at any time. There was a risk of some discomfort during the pain perception testing but subjects terminated the stimulus when it became painful. Confidentiality was ensured for all subjects by using identification numbers and only the investigators had access to the data. A potential benefit was that subjects found to have positive fibrositis examinations were given recommended follow-up facilities for treatment.

Analysis of Data

Each subject had a pain threshold and pain tolerance score for control and trigger points. Scores ranged from 0.1 kilogram to 9.9 kilogram based on the dolorimeter reading for each individual. Mean scores for the fibrositis group and the control group were obtained and compared using a t-test. The t-test was chosen due to its appropriateness for comparing means of two groups.

Mean scores of A-State and A-Trait Anxiety were also obtained for each individual. Scores ranged from twenty to eighty for both anxiety inventory questionnaires. Again, a t-test was used to compare the statistical differences between the means of both groups. Statistical significance was set at a probability level of $< .05$.

A third statistical test done was to compare pain threshold and pain tolerance scores with A-State and A-Trait Anxiety scores to determine correlations between the two. The Pearson's r was chosen as it is the most frequently used linear correlation coefficient. Also, the data follows the assumptions necessary for using the Pearson's r as both the pain measurements and anxiety scores are interval scale variables and are linearly related.

Chapter III

RESULTS

Five hundred and ninety people completed Questionnaire I. Forty-seven were determined to meet criteria for fibrositis and of these twenty-two agreed to participate in the study. Subjects were determined to be either in Group 1 (fibrositis) or in Group 2 (control) according to responses to Questionnaire I. For complete questionnaire responses see Appendix J.

Subjects

Subjects not having fibrositis symptoms by the questionnaire were called and asked to participate in the study as the control group. An equal number of control subjects were obtained trying to match for age, sex, and race. Age for subjects in Group 1 was 34-83 years with a mean of 56 years. There was no difference in range or mean age of Group 2 subjects. There were seventeen females and five males in Group 1 and sixteen females and six males in Group 2. Group 1 had twenty caucasians and two subjects who did not specify race. Group 2 also had twenty caucasian subjects, one Negro and one subject who did not specify race. Differences of sex and race between the two groups resulted from who decided to participate in the study from all possible

control subjects contacted.

Pain Perception

Statistical tests used for the analysis were the one-tailed Student's t-test and the Pearson r correlation coefficient. In order to test pain perception each of the five control points had two readings, threshold response and tolerance response, for a total of ten responses. Readings were analyzed using the one-tailed Student's t-test.

Although no control points were found to be significantly different at a p value < 0.05, Group 1 had a somewhat lower pain threshold and tolerance for the forehead ($\bar{x}$ 8.89, $\bar{x}$ 10.32) and thumb ($\bar{x}$ 10.67, $\bar{x}$ 11.50) than Group 2 ($\bar{x}$ 10.47, $\bar{x}$ 11.13/ $\bar{x}$ 11.61, $\bar{x}$ 12.50). Conversely, Group 2 had a lower pain threshold and tolerance for the shin ($\bar{x}$ 10.60, $\bar{x}$ 11.24) than Group 1 ($\bar{x}$ 11.24, $\bar{x}$ 12.04). Therefore, the hypothesis that the fibrositis group would have a lower pain threshold and tolerance is rejected. Figures 1 and 2 illustrate the pain threshold and tolerance of control points for both groups.

Anxiety

The Spielberger State-Trait Anxiety Inventory was used to test the hypothesis that fibrositis patients have higher anxiety levels than patients without fibrositis. Means were calculated for both Group 1 and Group 2 subjects and Student's t-test used to compare their means. Only questionnaires

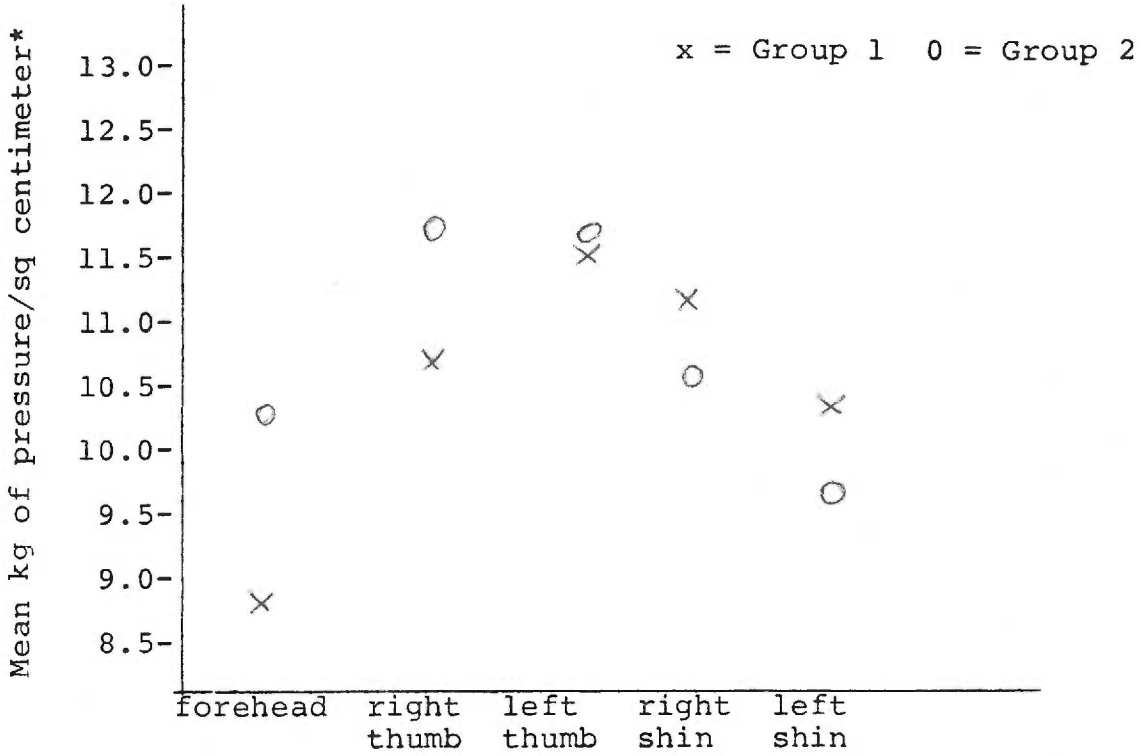

Figure 1. Pain threshold.

*dolorimeter diameter = 1.54 cm^2

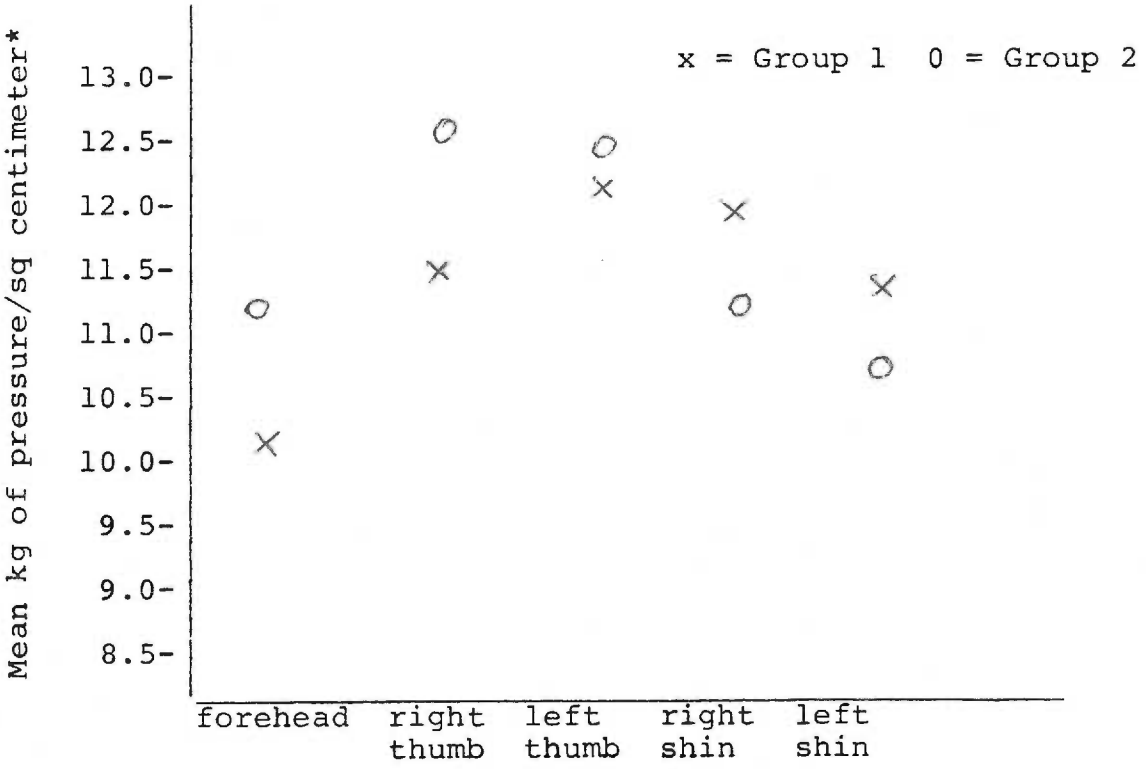

Figure 2. Pain tolerance.

*dolorimeter diameter = 1.54 cm^2

with all questions answered were analyzed. Two of Group 1 and four of Group 2 questionnaires were withdrawn from analysis due to being incomplete leaving a total sample of twenty completed questionnaires in Group 1 and eighteen completed questionnaires in Group 2. Mean A-State and A-Trait scores were lower for Group 1 ($\bar{x}$ 40.50, $\bar{x}$ 39.77) than Group 2 ($\bar{x}$ 44.89, $\bar{x}$ 43.83); this is not statistically significant at $p < 0.05$ (see Table 1). Therefore, the hypothesis that the fibrositis group would have higher anxiety levels than the control group is not supported.

Table 1

Anxiety t-test Results

Anxiety Measure	Group 1 (fibrositis patients) *n = 20	Group 2 (control patients) *n = 18	t value p value
A-State	$\bar{x}$ = 40.50 s.d. = 12.35	$\bar{x}$ = 44.89 s.d. = 8.31	t = -1.27 p = NS
A-Trait	$\bar{x}$ = 39.77 s.d. = 11.53	$\bar{x}$ = 43.83 s.d. = 8.49	t = -1.24 p = NS

*number of subjects based on those answering all questions on the State-Trait Anxiety Inventory
NS = nonsignificant at $p < 0.05$

A Pearson's r correlation coefficient was used to determine correlations between control points, A-State anxiety and A-Trait anxiety for each group. A-State anxiety was positively correlated with A-Trait anxiety in both groups ($c = 0.942$, $c = 0.775$) at a significant level ($p < 0.001$).

In Group 1, A-State anxiety was significantly correlated with three control points while A-Trait anxiety was significantly correlated with seven control points ($p < 0.05$). While not all were significant, all the correlations for Group 1 were in a negative direction.

However, in Group 2, A-State anxiety was not significantly correlated with any control points. A-Trait anxiety was negatively correlated with two control points at a significant p value of <0.05. Correlations between control points, A-State anxiety and A-Trait anxiety for both groups are presented in Tables 2 and 3.

Table 2

Pearson Correlations for Control Points and A-State Anxiety

Control Point	forehead threshold	forehead tolerance	right thumb threshold	right thumb tolerance	left thumb threshold	left thumb tolerance	right shin threshold	right shin tolerance	left shin threshold	left shin tolerance
Group 1 (fibrositis patients)	c=-0.322	c=-0.456	c=-0.353	c=-0.369	c=-0.199	c=-0.172	c=-0.151	c=-0.136	c=-0.479	c=-.450
	n=20	n=20	n=20	n=20	n=19	n=19	n=20	n=20	n=20	n=20
	p=0.08	p=0.02*	p=0.06	p=0.06	p=0.21	p=0.24	p=0.26	p=0.28	p=0.02*	p=0.02*
Group 2 (control patients)	c=0.040	c=0.036	c=-0.046	c=-0.051	c=-0.108	c=-0.126	c=-0.004	c=0.020	c=-0.095	c=-0.155
	n=18	n=18	n=18	n=18	n=17	n=17	n=18	n=18	n=18	n=18
	p=0.39	p=0.44	p=0.43	p=0.37	p=0.34	p=0.32	p=0.49	p=0.47	p=0.35	p=0.27

* significant at $p < 0.05$

Table 3

Pearson Correlations for Control Points and A-Trait Anxiety

Control Point	forehead threshold	forehead tolerance	right thumb threshold	right thumb tolerance	left thumb threshold	left thumb tolerance	right shin threshold	right shin tolerance	left shin threshold	left shin tolerance
Group 1 (fibrositis patients)	c=-0.384	c=-0.453	c=-0.469	c=-0.482	c=-0.372	c=-0.309	c=-0.085	c=-0.087	c=-0.459	c=-0.408
	n=22	n=22	n=22	n=22	n=21	n=21	n=22	n=22	n=22	n=22
	p=0.04*	n=0.02*	p=0.01*	p=0.01*	p=0.05*	p=0.09	p=0.35	p=0.35	p=0.02*	p=0.03*
Group 2 (control patients)	c=-0.311	c=-0.327	c=-0.055	c=-0.271	c=-0.01	c=-0.181	c=-0.240	c=-0.287	c=-0.487	c=-0.555
	n=18	n=18	n=18	n=18	n=17	n=17	n=18	n=18	n=18	n=18
	p=0.10	p=0.09	p=0.41	p=0.14	p=0.49	p=0.24	p=0.17	p=0.12	p=0.02*	p=0.01*

* Significant at $p < 0.05$

Chapter IV

DISCUSSION

The results do not support the hypothesis that patients with fibrositis have an enhanced pain perception when compared to patients without fibrositis. Neither pain threshold nor pain tolerance was found to be statistically different between the two groups. These mixed results and the fact that none were significant indicate that subjects with fibrositis do not have a lower pain threshold or tolerance than subjects without fibrositis. In this respect, this study does not support Smythe's hypothesis that fibrositis is a form of a pain amplification syndrome (Smythe, 1979). This study is the first attempt to test this hypothesis.

Since past studies have implied that the variables of age, sex and race may affect pain perception, it was important to control their possible effects on the results (Chapman & Jones, 1944; Merskey & Spear, 1964). Based on the results of the subject characteristics, the two groups appear to be matched.

While this study was not specifically designed to test the validity of specific trigger point areas, the trigger points were found to be significantly different between the two groups. The Group 1 subjects showed significantly less pressure tolerated over these areas than Group 2

($p < 0.001$). On the basis of these findings it is apparent that the control points can be readily distinguished from the generally accepted trigger point areas of fibrositis. Furthermore, this finding supports the literature on pain perception indicating that the forehead, thumb and shin are valid measures of control points (Keele, 1954; Davidson & McDougall, 1969; Woodforde & Merskey, 1971).

The State-Trait Anxiety Inventory results rejected the hypothesis that fibrositis patients have higher anxiety levels. In fact, the control group had higher mean scores for both A-State anxiety and A-Trait anxiety than the fibrositis group. Higher mean scores indicate higher anxiety levels. Since the results were not statistically significant, it can not be said that fibrositis patients in general are less anxious. However, since their scores were lower than the control group's it can be said that the fibrositis group was not more anxious. This finding conflicts with the Yunus study that reported fibrositis patients to be more anxious (Yunus et al., 1981). A possible reason for this difference is related to patient selection. In this study, patients were recruited from a general medicine clinic and were not specifically complaining of musculoskeletal pain. Furthermore, they all had a chronic illness which may have affected their anxiety. A-State anxiety was higher in both groups than A-Trait anxiety. A-State anxiety measures how the subject feels presently. Therefore, both groups

may have experienced some degree of increase in anxiety due to the testing situation.

The Pearson r correlation results showed that A-State and A-Trait anxiety were positively correlated at a significant level ($p < 0.001$). This supports the work of Spielberger who showed that the higher an individual's A-Trait anxiety level the higher the A-State anxiety level (Spielberger et al., 1970).

A-Trait anxiety correlations with control points were significant more frequently for both groups than A-State anxiety. This is in agreement with Elton's study which found A-Trait anxiety significantly correlated with pain threshold and tolerance while A-State anxiety was not (Elton et al., 1978). An explanation for this is that A-Trait anxiety is subject to less fluctuation within an individual than A-State anxiety and is therefore less effected by the experimentation situation or extraneous variables. This study reinforces Elton's concept that A-Trait anxiety may be a better clinical correlate in pain perception studies.

Results of the correlations between A-State anxiety, A-Trait anxiety and control points were similar among the two groups. In Group 1, the control points were negatively correlated with both A-State and A-Trait anxiety. In Group 2, A-State anxiety was negatively correlated with all but three control points and A-Trait anxiety was negatively correlated with all control points. This negative relation-

ship supports past sutides showing that higher anxiety is related to a decrease pain threshold and tolerance (Lynn & Eysenck, 1961; Stembach, 1976).

Chapter V

SUMMARY

Results

The purpose of this study was to measure pain perception and anxiety in patients with fibrositis and in those without fibrositis to determine if these two factors differ in the fibrositis population. Although fibrositis was documented in the literature over a century ago, its incidence, etiology and characteristics remain controversial today. One common feature of the disorder stated consistently throughout the fibrositis literature is that of pain. Past research has shown that the perception of pain is a subjective phenomenon influenced by a variety of factors. Specific to this study is the relationship between pain perception and anxiety. Anxiety has been found by past researchers to enhance pain perception thus lower pain threshold and tolerance. The relationship between anxiety and pain perception in fibrositis has not been previously studied. Therefore the goal of this study was to gather information that would aide in further understanding the pain in fibrositis.

The hypotheses of the study were 1) patients with fibrositis have higher anxiety levels than patients without fibrositis; 2) patients with fibrositis have an enhanced pain perception when compared to patients without fibrositis. Using a non-

experimental, descriptive and comparative study design, twenty-two subjects with fibrositis and twenty-two matched control subjects were tested. Pain perception was measured by subjects' response to pressure exerted by a dolorimeter on specific nontender, control points. Anxiety was measured by the Spielberger State-Trait Anxiety Inventory.

The results showed that neither pain threshold nor pain tolerance was significantly different between the two groups. Thus the hypothesis that fibrositis patients have an enhanced pain perception was rejected. Also, both A-State and A-Trait anxiety levels were not significantly different between the groups which does not support the hypothesis that fibrositis patients have higher anxiety levels than patients without fibrositis.

Limitations of the Study

The results of the study cannot be generalized due to small sample size. The sample size was further decreased in the anxiety test analysis due to subjects failing to complete questionnaires. This may have influenced the number of significant results. There are no normal values of anxiety levels for chronic illness populations thus anxiety levels of the subjects tested cannot be said to be higher or lower than normal. Also, as all the fibrositis patients had a coexisting chronic illness the results of pain perception and anxiety testing cannot be generalized to fibrositis patients without a coexisting illness.

Implications for Nursing

Diffuse musculoskeletal aching pain is a common ailment in the general population. In a certain number of patients this is due to a poorly defined syndrome which has been called fibrositis. The key to making this diagnosis is the finding of specific trigger point areas which are remarkably constant from patient to patient. It is apparent from this study that this group of patients do not have a generally lower pain threshold or tolerance. However, they do have an increased pain sensitivity over these specific trigger points. For this reason it is important that nurses be aware of these specific trigger point locations in order to recognize fibrositis.

The fact that all of the control subjects had higher anxiety levels than the fibrositis group suggests that anxiety may accompany chronic illness regardless of the specific disorder. Therefore it may be useful for nurses to teach stress management techniques to patients with any chronic illness. Spielberger's A-Trait anxiety level was found to be more significantly correlated with pain perception thus when evaluating patient's anxiety levels and effectiveness of stress management, the A-Trait anxiety questionnaire would be more specific than the A-State anxiety questionnaire.

Suggestions for further study developed from the results of the present investigation are as follows:

1. Replication of this study using a larger sample size

in both groups so results could be more generalized.

2. Replication of this study using patients attending a rheumatology clinic with the specific complaint of fibrositis to see if pain perception and anxiety levels differ from the present results.

3. Replication of this study using a healthy population in order to determine if pain perception and anxiety have different results in patients with fibrositis without a coexisting chronic illness.

4. Anxiety level measurements of patients with different chronic illnesses to develop normative values for the Spielberger State-Trait Anxiety Inventory for these populations.

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APPENDICES

APPENDIX A

Location of Trigger Points in Fibrositis

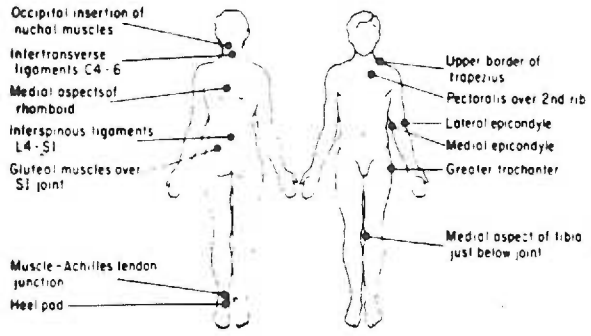


Figure 1.—Areas where pain is commonly found in patients with fibrositis. Palpations should be firm and the specificity of tenderness confirmed by palpation of an adjacent area. There are 25 representative points shown, making up 12 paired areas and one central area.

Bennett, Robert M. Fibrositis: Misnomer for a common rheumatic disorder. Western Journal of Medicine, 1981, 405-413.

APPENDIX B

ID#_____

Questionnaire I

Instructions to Patients:

Staff from the arthritis clinic are interested in studying certain rheumatic conditions and are requesting your help. Patient's report of symptoms are needed to assist with this study. Please read the consent form on the reverse side. If you agree to participate in the study:

1. Complete and sign the consent form.
2. Complete the "Self Report of Symptoms."
3. Put the form in the large envelope by the receptionist window.

If you have any questions please notify the receptionist.

If you chose not to participate, please return the form to the receptionist.

Thank you

Age_____ Sex_____ Clinic_____

Self Report of Symptoms	Almost never	Some-times	Often	Almost Always
1. Exercise makes me feel better	1	2	3	4
2. I sleep well at night	1	2	3	4
3. I feel rested when I get up in the morning	1	2	3	4
4. I wake up frequently at night	1	2	3	4
5. I tire easily	1	2	3	4
6. I am too tired during the day to do what I want to do	1	2	3	4
7. I have pain in my neck and shoulders	1	2	3	4
8. I am stiff in the morning	1	2	3	4
9. I have pain in my muscles and joints	1	2	3	4
10. I ache in the morning	1	2	3	4

If you circled 3 or 4 on questions 7, 9, or 10, answer the following:

11.	Pain wakes me up at night	1	2	3	4
12.	Heat (such as a heating pad) helps my pain	1	2	3	4
13.	My pain is affected by the weather	1	2	3	4
14.	I have more pain when I am emotionally upset	1	2	3	4
15.	My pain is worsened by noise	1	2	3	4

Diagnoses of "Possible Fibrositis," for purpose of return visit, requires positive answers ("often" or "amost always")

To:

a) Questions 7 or 9

and

Questions 8 or 10

and

Question 3 ("Almost never" or "Sometimes")

and b) 2 of the following:

Questions 1, 11, 12, 13, 14, 15.

APPENDIX C

OREGON HEALTH SCIENCES UNIVERSITY

Consent Form I

I, _____, agree to serve as a subject in the investigation titled, "Population Survey of Fibrositis I" conducted by Dr. Robert Bennett, M.D. The research aims to determine if certain symptoms patients have are diagnostic of fibrositis.

I understand my participation will involve:

1. Answering a written questionnaire about certain symptoms I may have. This will take approximately 10 minutes and will be done while I am waiting in the clinic.

I may be requested to participate further by returning to the clinic, answering three additional questionnaires, having a brief physical examination and a blood test. Participation in this initial survey does not constitute consent for the second survey. If requested to participate further I will be provided an additional consent form.

My participation does not involve any known risk. No blood or urine tests will be required for this survey. The information I provide will be available only to those directly involved in this study. I may not receive direct benefit from participation in this project, but even if I do not personally benefit, the information gained may help with the understanding of fibrositis.

Dr. Bennett or his associates have offered to answer any questions about my participation in this study. I understand that I may refuse to participate or withdraw from this study at any time without affecting my relationship with, or treatment at, the Oregon Health Sciences University.

"It is not the policy of the Department of Health and Human Services or any other agency funding the research project in which you are participating, to compensate or provide medical treatment for human subjects in the event the research results in physical injury. The Oregon Health Science University, as any agency of the State, is covered by the State Liability Fund. If you suffer any injury from the research project, compensation would be available to you only if you establish that the injury occurred through the fault of the University, its officers or employees. If you have further questions, please call Dr. Michael Baird, M.D., at (503) 225-8014."

I have read the foregoing and agree to participate in this study.

Signature _____

Name (printed) _____

Address _____

_____

Date _____ Phone # _____

SC:jb

APPENDIX D

Letter Requesting Participation

Thank you for completing our questionnaire, Population Survey of Fibrositis, in clinic recently.

We are studying fibrositis, a poorly understood disease consisting of diffuse muscle aching and pain, and are trying to determine how common it is and what its characteristics are. Because of the way you answered the questions on Part I, we would very much appreciate your help by participating in Part II.

Part II of the study involves:

1. answering three questionnaires relating feelings, moods, and symptoms you have,

2. having a brief medical history interview,

3. having a very brief physical examination limited to your muscles,

4. having a blood test drawn.

This should take at most 90 minutes.

This is a special study and is not part of your routine clinic followup. It will take place in the OPC Clinic building on the 3rd floor. There is no charge to you for this, and you will be informed of the results.

We would very much like your help, even if you don't feel you have any muscle or joint problems. Your participation will assist nurses and doctors in further understanding a common but poorly understood condition.

If you are willing to participate in this second part of the study, please call Diana Chambers at 225-8963 to schedule an appointment.

Thank you for your help.

Robert M. Bennett, M.D.
Chief of Rheumatology

APPENDIX E

OREGON HEALTH SCIENCES UNIVERSITY

Consent Form II

I, _____, agree to serve as a subject in the investigation titled, "Population Survey of Fibrositis II" conducted by Dr. Robert Bennett, M.D. The Research aims to determine if certain symptoms patients have are diagnostic of fibrositis.

I understand my participation will involve:

1. Answering three questionnaires, relating to feelings, mood, and symptoms I have.
2. Having a medical history interview.
3. Having a brief physical examination.
4. Having a blood test drawn of approximately four tablespoons of blood.

This will take approximately 90 minutes on one occasion.

I may experience slight discomfort during the examination or having my blood drawn. I may receive direct benefit from participation in this study but even if I do not personally benefit, the information gained from my participation may help with the understanding of fibrositis.

The information obtained will be kept confidential and will be available only to those directly involved in this study.

Dr. Bennett or his associates have offered to answer any questions about my participation in this study. I understand that I may refuse to participate or withdraw from this study at any time without affecting my relationship with, or treatment at, the Oregon Health Sciences University.

"It is not the policy of the Department of Health and Human Services or any other agency funding the research project in which you are participating, to compensate or provide medical treatment for human subjects in the event the research results in physical injury. The Oregon Health Sciences University, as any agency of the State, is covered by the State Liability Fund. If you suffer any injury from the research project, compensation would be available to you only if you establish that the injury occurred through the fault of the University, its officers or employees. If you have further questions, please call Dr. Michael Baird, M.D., at (503) 225-8014."

I have read the foregoing and agree to participate in this study.

Signature_____

Date _____ Witness _____

APPENDIX F

Date:_____ ID#_____

Population Survey of Fibrositis - Questionnaire II

Pain Characteristics		Not at all	Mild	Mod.	Severe
1. Location	Neck	___	___	___	___
	Shoulders	___	___	___	___
	Arms	___	___	___	___
	Upper back	___	___	___	___
	Lower back	___	___	___	___
	Hips	___	___	___	___
	Legs	___	___	___	___
	Chest	___	___	___	___
	Abdomen	___	___	___	___
	Other:	___	___	___	___
2. Character	Sharp	___	___	___	___
	Dull	___	___	___	___
	Burning	___	___	___	___
	Constant	___	___	___	___
	Intermittent	___	___	___	___
	Aching	___	___	___	___
	Stiffness	___	___	___	___
	Heaviness	___	___	___	___
	Other:	___	___	___	___

3. Duration:

4. Precipitant: Trauma-
Other-

Sleep Disturbance		Yes	No	
1. Description:	Problem falling asleep	___	___	
	Waking frequently	___	___	Why:
	Waking early	___	___	
	Waking w/ aching/stiffness	___	___	Duration:
	Waking tired	___	___	
	Tired during day	___	___	

Activity Job:
If unemployed, why:
how long:
Housework:
Regular exercise:
Current activity compared to previous activity: Same____
Less____
Describe: More____

Ethnic Background: Cauc Black Am.Ind. Hispanic Oriental

SE Asian Other:

Previous Therapy

				(circle drug used)
___	___	___	___	ASA/Tylenol/Datril
___	___	___	___	codeine/Percodan/Norgesic/Demerol/ Dilaudid/Darvon/Talwin
___	___	___	___	Valium/Librium/Serax/Tranxene
___	___	___	___	Phenylbutazone/indomethacin/Motrin/ Tolectin/Naprosyn/Nalfon/Meclomen
___	___	___	___	prenisone
___	___	___	___	Elavil/Triavil/Sinequan/Vivactil/ Tofranil
___	___	___	___	Flexeril/Robaxin
___	___	___	___	Local injection
___	___	___	___	Massage
___	___	___	___	Acupuncture
___	___	___	___	Relaxation therapy
___	___	___	___	Physical therapy
___	___	___	___	Chiropractic
___	___	___	___	Other:

Other Medical Conditions	Current Medications
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.

Chart Review Used: Yes No

APPENDIX G ID#_____

Population Survey of Fibrositis - Physical Exam

Trigger Points:
1. Area lightly palpated to identify most tender point
2. Dolorimeter placed directly over point and pressure slowly increased (0-10 Kg in 5 seconds)
3. Record pressure reading when patient begins to note subjective pain, and when objective signs of intolerance are observed (flinching, withdrawal, verbal request to stop).

Trigger point areas
1. Occiput: 2 cm below occipital crest, 1 cm lateral to midline
2. Intertransverse ligaments: anterior to transverse processes, C4-6
3. Trapezius: midpoint of upper border
4. Paraspinous: 3 cm lateral to midline at level of mid-scapula
5. Second costochondral junction: upper border of second rib just lateral to costochondral junction
6. Elbow: 1-2 cm distal tolateral epicondyle over or distal to insertion of finger extensors
7. Lumbar spine: midline over interspinous ligaments L4-S1
8. Gluteus: upper half of mid-gluteus medius
9. Medial knee: between joint line and adductor tubercle

Control areas
10. Forehead: midline just below scalp line
11. Upper back: 4 cm medial to trapezious trigger point
12. Forearm: volar aspect mid forearm
13. Thumb: over thumbnail with thumb placed on table
14. Shin: over boney prominence of mid-shin

(sub/obj) Right		(subj/obj) Left		
____	____	____	____	Occiput
____	____	____	____	Intertransverse ligaments
____	____	____	____	Trapezius
____	____	____	____	Paraspinous

(sub/obj) Right		(subj/obj) Left		
____	____	____	____	Second CC junction
____	____	____	____	Elbow
	____	____		LS spine
____	____	____	____	Gluteus
____	____	____	____	Medial Knee
	____	____		Forehead
____	____	____	____	Upper back
____	____	____	____	Forearm
____	____	____	____	Thumb
____	____	____	____	Shin

Skin Fold Tenderness (Kg): _____ R _____ L — Fold of skin at extreme upper border of trapezius raised from psteriorly by fingers; dolorimeter placed anteriorly with pressure exerted posteriorly, until objective signs of pain noted; pressure in Kg recorded.

Reactive Hyperemia (+/-): _____ F _____ L — Development of definite erythema in area of skin fold tenderness 1 minute after testing.

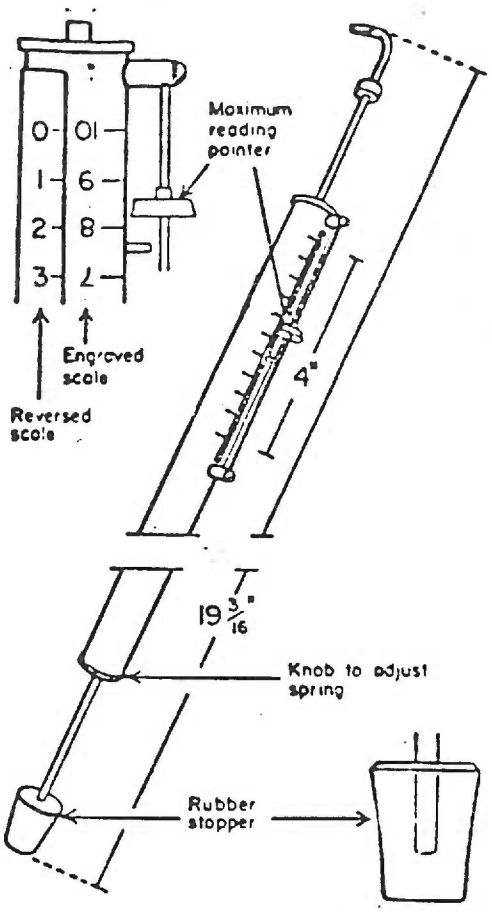
Criteria for diagnosis of fibrositis:

1. Presence of symptoms for possible fibrositis from Questionnaire I: Yes No

2. Presence of tender (less than 4 Kg pressure required for objective pain) in at least 12 of 17 trigger points: Yes No

APPENDIX H

Dolorimeter



McCarty, J., Gatter, Phelps

Square area 1.54 cm

Fig. 1. A push-pull gauge, used widely in industry, has been adapted as a dolorimeter by (1) reversing the pound scale engraved on the instrument by placing a strip of marked adhesive tape over it and (2) inserting the tip of the plunger into a No. 1. black rubber stopper.

The scale is adjusted to zero with the instrument in a vertical position. The point to be evaluated should be flat on the noncompressible surface. The rubber tip is placed squarely over the joint and pressure is exerted through 10 pounds or until the patient indicates with a pre-arranged signal that the pain threshold has been reached. The scale is read at this point and the score recorded in tenderness units on an appropriate form. Tenderness unit = 10 minus the number of pounds of force necessary to produce pain. The rate of application of force is an important variable: slower rates produce higher scores because of the temporal summation of painful impulses and because the time necessary

for the patient to indicate pain from the time he perceives it (reaction-time) is less significant. The optimum time required to apply 10 pounds of force was empirically determined to approximately 2 seconds. Attention to this point minimized interobserver error.

PRECISION OF THE METHOD

Duplicate determinations on individual joints showed a Gaussian distribution of error. The mean intraobserver error was 0.7 points. The mean error in duplicate determinations on individual joints in other patients varied from 0.35 to 0.8 points.

APPENDIX I

SELF-EVALUATION QUESTIONNAIRE

Developed by C. D. Spielberger, R. L. Gorsuch and R. Lushene

STAI FORM X-1

NAME _____ DATE _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	Not at all	Somewhat	Moderately So	Very Much So
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I am regretful	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel rested	1	2	3	4
9. I feel anxious	1	2	3	4

	Not at All	Somewhat	Moderately So	Very Much So
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel "high strung"	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel over-excited and "rattled"	1	2	3	4
19. I feel joyful	1	2	3	4
20. I feel pleasant	1	2	3	4

APPENDIX I (continued)

STAI FORM X-2

Patient Number_____ DATE_____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

		Almost Never	Sometimes	Often	Almost Always
21.	I feel pleasant	1	2	3	4
22.	I tire quickly	1	2	3	4
23.	I feel like crying	1	2	3	4
24.	I wish I could be as happy as others seem to be	1	2	3	4
25.	I am losing out on things because I can't make up my mind soon enough . . .	1	2	3	4
26.	I feel rested	1	2	3	4
27.	I am "calm, cool, and collected"	1	2	3	4
28.	I feel that difficulties are piling up so that I cannot overcome them . . .	1	2	3	4
29.	I worry too much over something that really doesn't matter	1	2	3	4
30.	I am happy	1	2	3	4
31.	I am inclined to take things hard	1	2	3	4

	Almost Never	Sometimes	Often	Almost Always
32. I lack self-confidence	1	2	3	4
33. I feel secure	1	2	3	4
34. I try to avoid facing a crisis or difficulty	1	2	3	4
35. I feel blue	1	2	3	4
36. I am content	1	2	3	4
37. Some unimportant thought runs through my mind and bothers me	1	2	3	4
38. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
39. I am a steady person	1	2	3	4
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

APPENDIX I (continued)

Scoring the Self-Evaluation Questionnaire

Range on each of the A-State and A-Trait 20-80.

Some of the items are worded in such a manner that a rating of (4) indicates a high level anxiety, while others are worded so that a high rating indicates low anxiety. For items on which a high rating indicates low anxiety, the scoring weights are reversed (4, 3, 2, 1).

The reversed items on the STAI Sub-Scales are:

A-State Scale: 1, 2, 5, 8, 10, 11, 15, 16, 19 and 20.

A-Trait Scale: 21, 26, 27, 30, 33, 36, and 39.

APPENDIX J

Results of Response to Questionnaire I

	Question	Group 1 (fibrositis patients) $\underline{n}$ = 22 $\bar{x}$/s.d.	Group 2 (control patients) $\underline{n}$ = 22 $\bar{x}$/s.d.
1.	Exercise makes me feel better.	2.09/0.75	2.82/1.05
2.	I sleep well at night.	1.59/0.50	2.41/1.05
3.	I feel rested when I get up in the morning.	1.35/0.49	3.09/1.15
4.	I wake up frequently at night	3.09/0.97	2.91/0.77
5.	I tire easily.	3.09/0.97	2.95/1.02
6.	I am too tired during the day to do what I want to do.	3.05/0.95	2.76/0.99
7.	I have pain in my neck and shoulders	3.59/0.67	2.36/1.22
8.	I am stiff in the morning	3.50/0.80	2.32/1.29
9.	I have pain in my muscles and joints.	3.73/0.46	2.91/0.99
0.	I ache in the morning.	3.73/0.46	2.23/1.23
1.	Pain wakes me up at night.	3.00/0.87	2.19/1.03
2.	Heat (such as a heating pad) helps my pain.	2.16/0.83	2.14/0.91
3.	My pain is affected by the weather.	2.82/0.96	2.24/1.22
4.	I have more pain when I am emotionally upset.	2.52/1.03	2.09/1.27
5.	My pain is worsened by noise	2.30/1.26	1.46/0.96

answer key: 1 = never 3 = often

2 = sometimes 4 = almost always

AN ABSTRACT OF THE THESIS OF

MARY ELIZABETH FOREHAND

'or the MASTER OF NURSING

)ate of Receiving this Degree: June 11, 1982

'itle: PAIN PERCEPTION AND ANXIETY IN PATIENTS WITH FIBROSITIS

Approved: _____
Sharon R. Clark, R.N., M.N., FNP, Thesis Advisor

Fibrositis is a rheumatic disorder characterized by diffuse musculoskeletal pain, fatigue and sleep disturbance (Bennett, 1981). Little is known about the emotion characteristics of fibrosits patients and how these characteristics may influence their pain. The pain literature states that pain perception is a highly subjective phenomenon that is influenced by anxiety. A non-experimental, descriptive and comparative study was undertaken to determine pain perception and anxiety in patients with fibrositis to aid in the further understanding of pain in this disorder. The hypothesis tested was that patients with fibrositis have an enhanced pain perception and higher anxiety levels than patients without fibrositis.

Forty-four subjects from the general medicine outpatient clinics at a university teaching hospital participated in

the study. Patients were divided into two groups according to their responses on a pain questionnaire. The fibrositis group (N = 22) had subjective complaints of muscle ache, fatigue and sleep disturbance. The control group (N = 22) did not have these complaints and were selected according to age, sex and race to match the fibrositis group. All subjects answered the Spielberger State-Trait Anxiety Inventory. Pain was elicited by a dolorimeter over ten nontender control areas and pain threshold and tolerance measured for each subject.

Using a one-tailed Student's t-test and a Pearson r correlation coefficient, results of the anxiety questionnaire and pain perception testing were analyzed. The hypotheses were rejected as the major findings of the study were:

1. Fibrositis patients do not have an enhanced pain perception compared to patients without fibrositis.

2. Fibrositis patients do not have higher anxiety levels than patients without fibrositis.

The results of this study are limited due to sample size and that all subjects had a chronic illness. Replication of this study using larger samples of patients with the complaint of fibrositis in absence of a coexisting chronic illness are needed in order to generalize the results that fibrositis patients do not have an enhanced pain perception or higher anxiety levels.