

Measurement of Pain in Fibromyalgia in the Clinic and Laboratory

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Abstract. Fibromyalgia involves constant aching pain throughout the body and acute pain at widely distributed tender points. This review emphasizes the different aspects of the pain experience which are assessed by verbal questionnaires, analysis of descriptive adjectives, numerical and verbal category scales and visual analogue scales. There is a need for studies which utilize ratio scale techniques to measure the different components of the pain experience and which explore a wider range of behavioral and functional measures. Laboratory data on responsiveness at tender and nontender points, examined with respect to adaptation level and hypervigilance theories, suggest that patients with fibromyalgia are overly reactive to external events which other groups, both pain free and pain suffering, find innocuous. (*J Rheumatol* 1989;(suppl 19) 16:113-9)

Key Indexing Terms:

FIBROMYALGIA

PAIN

TENDER POINTS

FIBROSITIS

The aim of this paper is to examine the assessment of pain in fibromyalgia—not in terms of incidence and other epidemiological variables, but in terms of severity. Can we measure this pain? Can we determine its intensity, emotional effect and cognitive evaluation? Can we demonstrate the effectiveness of treatments intended to ameliorate pain in fibromyalgia and report on the extent to which individual patients, rather than groups, have been aided by analgesic agents or procedures?

Assessment and pain are both complex and often controversial areas. Assessment issues go beyond simple quantification; at the least, researchers must deal with the nature of the scale employed: nominal, ordinal, interval or ratio in conjunction with questions about its reliability and validity.

Pain issues begin with the lack of agreement on the definition of the term "pain" itself (although the definition of the International Association for the Study of Pain¹ ["an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage"] provides a useful starting point. Pains, despite their categorization under a single verbal unit are, in fact, of infinite variety in terms of quality, quantity, site, duration and physical and psychological characteristics of the sufferer.

When we speak of pain assessment we should begin by

considering what we want to assess and why we want to do so. There is no all purpose instrument for pain assessment nor will there ever be. We can, by a variety of techniques, get a rough measure of pain in a particular patient and can usually conclude that reductions in the accompanying scale reflect reductions in one or more of the components of the experienced pain. We cannot, however, measure that pain on an absolute basis, conclude with certainty that one patient is feeling more or less pain than another one, or distinguish with certainty between malingerers and true sufferers. The elusive "pain thermometer" does not exist.

ARE MUSCLE PAINS A SEVERE PROBLEM?

In 1985, the polling firm of Louis Harris & Associates conducted a telephone survey of a representative cross-section of 1,254 Americans aged 18 and over. The aim of the survey, presented in a document titled the *Nuprin Pain Report*, was to determine "the extent to which Americans suffer from pain, how it affects them, and how they cope with pain"². They found that 53% had suffered from muscular pains in the last 12 months. However, 40% of these had experienced their pain for 5 days or less, while only 10% of these had muscle pains for more than 100 days during that year. Fifty-one percent of those surveyed had suffered from joint pains (of which 34% were very brief episodes and 19% were prolonged). The comparable figures for backache were 56, 39, and 16%.

Those interviewed were asked to respond to the question, "Measured on a scale of 1 to 10—with 1 being the least severe pain and 10 being the most severe pain possible—how would you rate the severity of these muscle pains?" Such a scale is, at least, ordinal. A pain rated 6 is, for that individual, likely to be more severe than one rated 3. But given

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the sparse instructions and given no further validation data, one should not conclude that a pain rated 6 is twice as severe as one rated 3 (the attribute of a ratio scale) or even that the difference in pains rated 3 and 6 is equal to the difference in those rated 6 and 9 (as holds in an interval scale).

For reporting purposes, the *Nuprin Report* data were compared across numerical categories, with ratings of 1 to 3 categorized as "slight" pain, 4 to 6 as "moderate", 7 to 9 as "severe" and 10 as "unbearable." While this is both convenient and informative, there is nothing obvious about the divisions used for creating these mutually exclusive groups.

For muscle pains, 5% of the patients labeled them as "unbearable" (a smaller percentage than any of the other pain types: headaches, backaches, joint pains, stomach pains, menstrual pains or dental pains). Only 18% of pain sufferers rated their muscle pains as severe—again a smaller percentage than any other source of distress. In 82%, muscle pains were perceived as slight or moderate.

These muscle pains, of course, arise from a large variety of causes. In 47%, sufferers ascribed their pain to "too much exercise" or "overexertion" and another 19% to injury. Only 5% mentioned arthritis. At least from the patient's viewpoint, muscle pain and arthritis are weakly linked.

MEDICAL RECOGNITION OF THE PRIMARY FIBROMYALGIA SYNDROME

During the period between January, 1983 and April, 1988 Medline, the computerized database of *Index Medicus*, compiled 155 references to fibrositis, fibromyalgia, or fibromyositis (although some articles used more than one of these terms in the title or abstract). While over 90% of 1977–1982 papers used the term fibrositis to describe the disorder, the use of the term primary fibromyalgia has now increased dramatically to about 40%. The articles appear almost exclusively in the medical literature. While physicians have recognized the primary fibromyalgia syndrome^{3–5}, psychologists and others interested in personality assessment, pain quantification, and measurement issues have, for the most part, remained unaware of both the disorder and the issues involved in its diagnosis, management and evaluation.

The literature on primary fibromyalgia syndrome is, primarily, a recent one. Of the 287 articles published in English between 1966 and May, 1988, 188 were published in 1977 or later. In 1978 7 papers were published; nearly 3 times as many appeared in 1987.

CLINICAL ASSESSMENT OF ENDOGENOUS FIBROMYALGIA PAIN

This section will review some of the assessment tools employed by the published studies in evaluating the pain and disability associated with primary fibromyalgia. It will become evident that a wide range of techniques have been utilized and that, for the most part, they fell into one or more of the following categories: verbal questionnaires, numerical

category scales, visual analogue scales, crossmodality matches and nonverbal indices.

The richness of these approaches is demonstrated by a recent report of Nolli, Ghirelli, and Ferraccioli⁶ who employed several measures to compare pain in fibromyalgia with that in patients with rheumatoid arthritis (RA) and osteoarthritis (OA). All 3 groups were comparable in average age (50–58 years) and duration of disorder (5.5–7 years).

Using an Italian version of the McGill Pain Questionnaire (MPQ)⁷, the authors had patients select which adjectives, if any, from 20 categories of pain descriptors described their typical pain. The words were ascribed to 3 classes: sensory, affective and evaluative and their relative weightings permitted the authors to determine individual as well as overall Pain Rating Indices.

The maximum possible score on the overall Pain Rating Index is 78. Patients with fibromyalgia gave the highest value of the 3 groups, 37.39, but this was not significantly different from the 34.65 provided by the patients with RA. Both were significantly higher than the pain scores given by patients with OA (20.77).

One must exercise caution in comparing these Italian scores with those on the English version of the MPQ, but it is instructive to compare the Pain Rating Index of 37 with values obtained for other disease categories. Such a value is extremely high.

Melzack, *et al.*⁸ reported that toothache and postherpes neuralgia yielded scores of less than 25, phantom limb pain, cancer pain and back pain were rated between 25 and 30, and only labor pain approached scores in the low to mid 30s. Either fibromyalgia is perceived as being exceedingly painful, sampling and selection factors limit comparisons across studies or linguistic and crosscultural factors^{9,10} influenced the scores obtained from the Italian patients. Each of these points deserves consideration; the 3rd proposal is given some credence when one compares the Pain Rating Index of the Italian patients with RA in the sample of Nolli, *et al.*⁶ (34.65) with that of the Canadian patients with RA whose data were reported by Melzack, *et al.*⁸ (less than 20).

Fortunately, more directly comparable information on MPQ performance from an Anglophone sample of patients with fibromyalgia is available. The data from a study on the effectiveness of amitriptyline in reducing the pain associated with fibromyalgia¹¹ provide both baseline and posttreatment Pain Rating Index on the MPQ. Scudds, *et al.*¹¹ found their patients to give Pain Rating Index scores of about 14, a value indicating a very much lower level of pain than that suggested by the Italian patients. As noted earlier, it remains to be established whether clinical factors, cultural differences or the language of the measuring instrument are the determining factors in accounting for these sizeable differences.

In either case, the MPQ is of potential value in evaluating the effects of putative analgesic agents and procedures, since subjects serve as their own controls. Scudds, *et al.*¹¹ found

significant reductions in the Pain Rating Indices, from about 14 to 8 or 9, after 4 weeks of amitriptyline administration. Both the sensory and the affective component of the pain experience showed significant reductions during treatment; these effects failed to occur in groups receiving placebo.

Analysis of the individual descriptors also yields interesting data about the nature of pain in fibromyalgia. More than half of the Italian patients⁶ described their pain as "tender," "aching," "exhausting," "sickening," "cold," and "unbearable." Other frequently chosen adjectives were "punishing," "tingling," "tiring," "agonizing," "gnawing," "jumping," and "stinging." Aside from elevations in "cold" and "fearful", the data are in fairly close agreement with the elevations shown for the patients with RA, although patients with fibrositis are less likely to describe their pains as "throbbing," "cramping," or simply "annoying."

Nolli, *et al*⁶ also asked their patients to draw body maps of their painful areas and to note both the number of such sites and their severity (using a descriptor scale ranging from 0 = none to 4 = tremendous). Both patients with fibromyalgia and RA selected about 11 sites (compared to 5 for the group with OA) and rated them an average of 3 on the 4 point scale (vs 2 for the OA group).

Another study that used the MPQ to compare patients with fibromyalgia and RA was conducted by Leavitt, *et al*¹². They were particularly interested in evaluating whether the general terms of "aching" and "stiffness" properly capture the clinical experience.

The scores on the Pain Rating Index were extremely high for both groups, but the comparison with the earlier studies suffers because patients were given the opportunity to select several words per category and because 9 extra descriptors were added to the questionnaire. The score for patients with fibromyalgia was higher, but not significantly so, than the one for the patients with RA.

Eighteen of the 87 descriptor words were used by more than 40% of the patients with fibromyalgia. More than half used such terms as "aching," "exhausting," "nagging," "hurting," "sore," "annoying," "shooting," and "troublesome"—frequently selecting the evaluative words which emphasize the reactions to the pain experience more than the sensory components or the emotional consequences.

More than 80% of the patients with fibromyalgia selected the term "aching", but an equal percentage of the patients with RA did so. In 48% of the first group and 64% of the latter, patients chose the term "stiff." Aching and stiffness are key elements of fibromyalgia, but they are neither unique to that disorder nor nearly exhaustive in describing the complex reactions to the painful condition of primary fibromyalgia syndrome.

The MPQ was employed in conjunction with a visual analogue scale in a study conducted by Perry, *et al*¹³. Noting the desirability of finding positive correlations between scores on different pain measures as a test of their validity,

along with the markedly varied correlations between MPQ and visual analog scale scores reported in the pain literature, the authors undertook to examine the relationship between these measures in patients suffering from a disorder with known organic etiology, inflammatory arthritis (primarily RA) and those with a disorder with little or no demonstrable histochemical pathology, primary fibromyalgia.

Unlike some of the previous studies, patients with fibromyalgia reported more pain than patients with arthritis. Their mean overall Pain Rating Index score was 25.5, considerably lower than the 37 found in the Nolli, *et al*⁶ study and close to the values for phantom limb, cancer and back pain presented by Melzack, *et al*⁸. The values were greater than those found by Scudds, *et al*¹¹, particularly for the affective scale.

On a 10 cm visual analogue scale, which was anchored by the terms "no pain" at the left and "worst pain ever" at the right, patients with fibrositis marked their pain intensity at 4.5 (compared to 3.1 for persons with arthritis). Scudds, *et al*¹⁴, in a study with a similar population, found scaled visual analog scale scores of only 3.0 for patients with fibrositis and 1.04 for an age and sex matched group with RA.

The results of these studies suggest that there is considerable variability among patients with fibromyalgia in the pain they describe, both within a regional sample (as shown by sizable standard errors of the mean) and across samples. Attempts to match different clinical groups for such variables as age, sex or duration of pain may further distort comparisons by selecting groups atypical of the more general disordered population.

Perry, *et al*¹³ examined the correlations between the visual analog scale and MPQ subscales for each of their 2 clinical groups. For the patients with arthritis, there was a high correlation between the visual analog scale and another MPQ scale, the Present Pain Intensity, which includes 5 categories ranging from "mild" to "excruciating." However, the visual analog scale did not correlate more than 0.26 with any of the MPQ verbal scales—sensory, affective, or total. These scales, however, correlated very highly with each other—a finding frequently reported^{7,15}.

For the patients with fibromyalgia, the data are yet more disturbing, since the visual analog scale did not even correlate with the Present Pain Intensity despite the outward similarity of the 2 scales. Again, there were significant, albeit smaller, correlations between the sensory, affective and total subscales. The sensory scale showed a negative correlation (-0.61) with the Present Pain Intensity.

The results of this provocative study require replication. The curious negative correlation between selected level on the Present Pain Intensity and the use of sensory descriptors of pain in fibrositis may, as Perry, *et al*¹³ suggest, reflect the presence of a distinct subgroup of such patients. Whether they are to be distinguished on the basis of sensory components of the pain experience or on the basis of personality

factors remains to be established. The data suggest, however, that pain measures which have proved to be reliable and valid in studying patients with demonstrable pathology may be suspect in studying those with possible functional disorders.

The MPQ has the virtue of focusing upon several components of the pain experience instead of rating pain as a unitary phenomenon. It does, however, require some time to administer and needs patients with both a broad vocabulary and the intellectual ability to select carefully from among a large series of words with subtle distinctions. For many clinical purposes, briefer procedures are desirable.

Numerous possibilities exist. One, the numerical rating scale, was described in the review of the *Nuprin Pain Report*². A more direct approach was used by Carette, *et al*¹⁶ in their study of a 9 week amitriptyline treatment regimen compared with a placebo control. Among other measures, the authors used a 1–10 scale of overall pain (where 10 = intolerable) and a 5 category scale of change in condition (1 = worse, 2 = unchanged, 3 = minimally improved, 4 = moderately improved, 5 = markedly improved). Even the first scale was sensitive enough to indicate reductions in pain at 5 and 9 weeks compared to baseline, but no significant differences were found between the amitriptyline and placebo groups. At 5 weeks, the overall improvement measure distinguished between the 2 groups, but at 9 weeks it did not do so.

A more basic pain scale consisting of only 4 categories was used by Felson and Goldenberg¹⁷ in a longitudinal study of patients with fibromyalgia. Among other questions, they were asked, "In terms of pain or stiffness, how have you been feeling the past week? Are you having a lot of pain (0), a moderate amount of pain (1), a little pain (2), no pain (3)."

In order to determine the sensitivity of such a scale, the authors applied it to a separate group of patients receiving amitriptyline and naproxen therapy. These subjects also completed a visual analogue scale to describe their pain at various stages of the clinical trial. The correlation between the 4 item survey and the visual analog scale was an impressive 0.72. The patients with fibromyalgia in the longitudinal study reported, for the most part, considerable pain. In 67%, pain was described as "a moderate amount" or "a lot," a value that remained constant throughout the 2 year survey period.

The data from the amitriptyline and naproxen study are presented in a separate report¹⁸. Baseline data on a 10 cm visual analogue scale indicate a very intense pain level of 7 to nearly 8, which was reduced to about 5 by amitriptyline and naproxen or by amitriptyline alone. Concurrently, significant declines also occurred in sensitivity at tender points, fatigue, sleep difficulty and patient and physician global assessment.

Another tricyclic antidepressant, dothiepin, was compared to placebo in the treatment of primary fibromyalgia syndrome in a study conducted by Caruso, *et al*¹⁹. Visual

analogue scale data showed a reduction from 6.6 (out of 10) at baseline to about 4.1 for the drug group and no change for those receiving placebo.

ANALYSIS OF DATA ON PAIN IN FIBROMYALGIA

Two major conclusions emerge from the data reviewed above. First, fibromyalgia is, for most patients, a very painful disorder. This is apparent in studies using the MPQ, category scales and visual analogue scales. The first requires verbal report, the second looks at numerical data, and the third requires either a number or a "crossmodal response"—a mark made along a 10 or 15 cm continuum. The pain of fibrositis is not only intense, it is constant. Bengtsson, *et al*²⁰ noted that 95% of patients with primary fibromyalgia syndrome report a continuous ache compared to only 5% of patients with RA.

The second conclusion is that, generally, each of these approaches is sufficiently sensitive to discriminate groups of patients with fibromyalgia, on the average, from those with other rheumatic disorders and to demonstrate the analgesic efficacy of a number of pharmacological agents.

Having said that, however, does not mean that these measures are sufficient in understanding the nature of pain in fibrositis or in fully evaluating analgesic procedures. A number of additional approaches to the clinical measurement of primary fibromyalgia seem appropriate.

While the MPQ emphasizes the multidimensional nature of the pain experience, most numerical and analogue scales ignore it. Recently, a number of investigators have demonstrated that scaled verbal descriptors²¹ or distinct visual analogue scales²² can elicit information about the intensity and the unpleasantness of the pain experience. Although the 2 generally correlate highly, analgesic agents and procedures may markedly reduce only one of them. Single measures of pain confound pain intensity and pain unpleasantness; it remains to be seen whether patients with fibromyalgia score high on both and whether drugs such as tricyclic antidepressants may reduce the affective component while leaving the sensory experience relatively unchanged.

At the outset of this paper, it was noted that measurement techniques possess nominal, ordinal, interval or ratio scale properties. Each, in turn, is more powerful than the preceding one. Nominal and ordinal scales are usually simple for both the experimenter and the patient and, consequently, they are widely used. In many studies such as those reported here, they convey information about the direction of change in pain. They do not, however, indicate whether pain has been reduced in steps of a given size or steps of a given proportion. Nor do they lend themselves to parametric statistical analysis. Direct scaling techniques²³, which appear to yield ratio scales, ought to be used more extensively in studies of primary fibromyalgia syndrome. At the least, this suggests the use of visual analogue scales which have no

numerical or verbal categories along the response continuum, which have clearly defined endpoints and which are presented for judgments along both the sensory discriminative and the motivational affective dimensions.

BEHAVIORAL AND FUNCTIONAL ASSESSMENT OF PAIN IN FIBROMYALGIA

Pain does not express itself only in verbal reports, numerical scales or crossmodal matches. Frequently, there are overt behavioral responses suggestive of a pain experience. While words and numbers lend themselves more readily to quantification than do facial expressions or bodily positions, an increasing number of pain researchers have begun to study the latter, and fibromyalgia is highly appropriate for these analyses.

In particular, work such as that by Keefe and Block²⁴ and McDaniel, *et al*²⁵ is relevant. These authors have examined the motor behaviors that accompany chronic pain, such as guarding, grimacing, bracing, sighing and rubbing of affected regions. Their data suggest that the behaviors can be reliably observed, that they correlate with pain intensity, that they decrease during treatment and that they are unaffected by states of depression²⁶.

Questionnaires which emphasize health status and functional impairment in activities of daily living, such as the Health Assessment Questionnaire, the Arthritis Impact Measurement Scales or the Sickness Impact Profile²⁶ appear to be reliable and valid measures of disability which are sensitive to drug treatments and provide considerable data beyond pain level. Self-reported measures of "the impact of pain on the patients' lives, the responses of others to the patients' communications of pain, and the extent to which patients participate in common daily activities"²⁷, such as the West Haven-Yale Multidimensional Pain Inventory, need to be employed in conjunction with direct pain measures in order to examine the interactions between the factors that influence the many manifestations of pain behavior. So, too, do questionnaires relating to coping strategies, locus of control, mood states, personality, psychosocial support and, for certain treatment studies, pain diaries.

LABORATORY STUDIES OF PAIN IN FIBROMYALGIA

The data reported above have emphasized the spontaneous, continuous, endogenous pain of the patient with fibromyalgia. This section will review the elicited, acute, exogenous pain which is special to the patient with fibromyalgia because of the multiplicity of tender and trigger sites. Pain of internal origin and pain of external origin can occur simultaneously in clinical patients. Although there are important questions about how the one affects the other¹⁵, Price²⁸ has shown that subjects can reliably match the 2 and that data points obtained from either direct scaling or pain

matching can be superimposed upon psychophysical power functions obtained from the scaling of a series of noxious stimuli such as heat pulses or electrical shocks. Price, *et al*²⁹ have presented some data suggesting that relative sensory and affective pain scores can be obtained for a series of clinical disorders.

There are 2 prime components of pain in fibromyalgia: the widespread and severe aching all over the body and the presence of large numbers of exquisitely sensitive tender points^{3-5,30,31}. The second can be included in the "laboratory" category because it requires physical pressure, either from the examiner's digit or from the application of a pressure dolorimeter. The data on the number, distribution and sensitivity of the tender points have been described in numerous publications. For instance, Yunus, *et al*³², in a study of 50 consecutive patients found that the total number of tender points in an individual ranged from 4 to 33 with a mean of 12.

Campbell, *et al*³³ evaluated 27 referrals, using a pressure dolorimeter to test 17 areas which are generally considered tender points and 9 control points. In 22 of the 27, at least 12 to 17 tender points (pressures of less than 4 kg/1.54 cm²) were present. Control patients, taken from other clinical services, had nearly no points with such low pain threshold. At the 5 control points (upper back, forearm, thumb, shin and forehead) there was no difference between the groups in pain threshold. The pain sensitivity range, between threshold and tolerance, was reduced over the tender points but not over the control points, suggesting differential slopes of the psychophysical functions relating perceived pain to stimulus pressure. The authors note that the results fail to support the notion that patients with fibrositis are "tender all over," since their threshold and tolerance was normal at the control points.

Wolfe, *et al*³⁴ reviewed the data from 155 patients recruited from 3 centers. The Wichita patients had tenderness in at least 7 of the 14 tender sites suggested by Smythe³⁵. The Los Angeles patients satisfied the criterion of tenderness at 10 or more of 25 sites specified by Bennett³⁶. The patients seen in San Antonio satisfied the criterion of local tenderness at 5 or more of 18 sites. The tender point count separated patients with fibromyalgia from patients with other rheumatic diseases better than any other criteria.

Simms, *et al*³⁷ noted the lack of uniformity in the number and site of tender points required for a positive diagnosis of fibromyalgia. In order to identify the sites which could best discriminate patients from healthy controls, they determined tenderness at 75 right sided anatomical locations. The mean number of points requiring pressure less than 4 kg/1.54 cm² to elicit flinching, withdrawal or a verbal request to stop was 34 in patients and 11 in controls. Using a strict criterion significance level set at $p < 0.001$, the tolerance was lower in patients than in controls at 19 sites (including only 2 of previously proposed tender points). All but 4 of these were

around the anterior shoulder, chest, posterior scapula and medial knee. There were only 3 points for which the patients had a higher tolerance than the controls but none of these approached significance.

These findings, as well as the lack of a difference between patients with fibromyalgia and controls at nontender points reported by Campbell, *et al*³³, are of interest because of an effect described by Rollman³⁸. Based upon a laboratory study with normal subjects in which it was apparent that pain judgments are frequently relative rather than absolute, it was suggested that the perception of experimentally induced pain may be quite different in pain patients and in normal controls. Pain patients may use their endogenous pain as an anchor or reference point and may, as a consequence, be less influenced by external stimulus factors. This "adaptation level" effect also suggests that patients may have a higher pain threshold or tolerance than controls, since the induced pain may seem weak in comparison to internal discomfort. A substantial number of studies have reported data which favor this concept and have shown reductions in pain threshold or tolerance (or increases in pain responsiveness) when the clinical pain problem has been resolved^{11,15}.

The adaptation level model stands in contradistinction to the notion that pain patients are hypervigilant—that they amplify their discomfort or overreact to external events³⁹. The hypervigilance model suggests that pain patients would have a lower pain threshold or tolerance than pain free controls and there also are data which support this prediction.

Since the predictions are in opposition, a full explanation of the results is lacking. It appears, however, as a first approximation, that the adaptation level model predictions are more often supported by studies on patients with clear organic pathology and that the hypervigilance model receives support from studies on pains with no clearly defined organic basis. Scudds, *et al*¹⁴ used a variable pressure dolorimeter to study pain responsiveness, using threshold and tolerance measures at a nontender point on the arm of patients with fibromyalgia, matched patients with RA and normal controls. As well, in order to test the generality of the predictions to time varying pressure pain and pain produced by direct activation of afferent nerves⁴⁰, similar tests were conducted with a pressure algometer and with constant current pulse trains.

For all 3 forms of nociceptive stimulation, patients with fibromyalgia had lower pain threshold and pain tolerance than the controls (with the RA group generally at an intermediate level); the data were variable, however, and reached significance only for the variable pressure dolorimeter.

At first, these results appear to run counter to those of Campbell, *et al*³³ who found no difference between patients with fibrositis and their comparison groups at nontender points. However, the 2nd group in their study was drawn from among adult patients attending the general medical and

subspecialty clinics at a large medical center and about 60% of these control patients also complained of moderate to severe musculoskeletal pain or other symptoms, including some with localized tendinitis, bursitis or OA.

More directly comparable data are found in a report by Tunks, *et al*⁴¹. Patients with fibromyalgia and pain free controls were tested with a pressure dolorimeter at 5 paired tender points and 5 paired nontender points. Both groups had lower tenderness thresholds at the tender points than the nontender points. Patients with fibromyalgia had thresholds which were about one third the normal values at both groups of points.

Given the potential interest in generalized hypervigilance behavior on the part of patients with fibromyalgia (as opposed to oversensitivity to only mechanical stimulation of fibrous tissue), the study conducted by Scudds, *et al*¹⁴ should be repeated, using thermal stimuli (which also can give rise to reports of deep aching pain) as well as electrical pulses.

In light of a strong association between fibromyalgia and irritable bowel syndrome⁴², the results of a study by Cook, *et al*⁴³ appear surprising. They found that patients with irritable bowel syndrome were less likely than normal controls to report a noxious stimulus (electrocutaneous pulse trains) as painful and concluded that the expression of symptoms in these patients is "not a consequence of a generalized increase in pain reporting tendency." The laboratory data obtained from patients with fibromyalgia do not support an equally dismissive statement for them.

SUMMARY

Pain is the most dominant diagnostic feature of fibromyalgia. The MPQ and the visual analogue scale, among other measures, attest to the global discomfort felt by such patients. The dolorimeter, when applied to tender points, demonstrates the exquisite sensitivity of multiple body sites. The lower pain threshold and tolerance at nontender sites suggest that a distortion in the perception of generally innocuous stimuli may be a characteristic of the disorder, but it remains to be determined whether treatments which attenuate the clinical symptoms also reduce the responsiveness to experimentally induced pains, particularly those which arise from nonmechanical stimuli. Assessment of pain in the clinic and in the laboratory are increasingly seen as moving hand in hand^{15,44}. Clinicians studying all painful disorders, but particularly fibromyalgia, might be well served to carry the dolorimeter in the left pocket and the visual analogue scale in the right one.

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