The relation between tender points and fibromyalgia symptom variables: evidence that fibromyalgia is not a discrete disorder in the clinic

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Abstract

Objective—To investigate the relation between measures of pain threshold and symptoms of distress to determine if fibromyalgia is a discrete construct/disorder in the clinic.

Methods—627 patients seen at an outpatient rheumatology centre from 1993 to 1996 underwent tender point and dolorimetry examinations. All completed the assessment scales for fatigue, sleep disturbance, anxiety, depression, global severity, pain, functional disability, and a composite measure of distress constructed from scores of sleep disturbance, fatigue, anxiety, depression, and global severity—the rheumatology distress index (RDI).

Results—In regression analyses, the RDI was linearly related to the count of tender points ($r^2=0.30$). Lesser associations were found between the RDI and dolorimetry measurements ($r^2=0.08$). The RDI was more strongly correlated with the two measures of pain threshold than any of the individual fibromyalgia symptom variables. In partial correlation analyses, all of the information relating to symptom variables was contained in the tender point count, and dolorimetry was not independently related to symptoms.

Conclusion—Tender points are linearly related to fibromyalgia variables and distress, and there is no discrete enhancement or perturbation of fibromyalgia or distress variables associated with very high levels of tender points. Although fibromyalgia is a recognisable clinical entity, there seems to be no rationale for treating fibromyalgia as a discrete disorder, and it would seem appropriate to consider the entire range of tenderness and distress in clinic patients as well as in research studies. The tender point count functions as a 'sedimentation rate' for distress, and is a better measure than the dolorimetry score.

Fibromyalgia represents the intersection of a considerably abnormal and reduced pain threshold with a series of clinical distress variables, including pain, fatigue, sleep disturbance, anxiety, and depression, among others. In the clinic, it is best diagnosed by counting the number of tender points a patient has. In the presence of 11 or more tender points and widespread pain, fibromyalgia is diagnosed (classified) according to American College of Rheumatology (ACR) Criteria. The ability to diagnose fibromyalgia with commonly agreed upon criteria has stimulated research into basic and clinic aspects of the syndrome. In general, research has used 'normals' or patients with other rheumatic diseases as control subjects. This comparison, of fibromyalgia with such control subjects, implies that fibromyalgia is a discrete entity. However, epidemiological studies suggest, instead, that fibromyalgia may be merely the end of a continuum of distress. Epidemiologically defined disease may be different from clinically defined disease, and the issue of whether fibromyalgia is a relatively discrete clinical entity has not been investigated in the clinic. This is an important question, because if fibromyalgia does represent a clinical as well as an epidemiological continuum, then we may be failing to identify many patients in the clinic with syndromes similar to fibromyalgia, though with fewer symptoms or tender points. In addition, in characterising patients as having or not having fibromyalgia we may be missing, in those with not enough tender points, important symptoms of distress. Finally, we may be concentrating basic and clinical research inappropriately into a constricted area of a pain-distress continuum.

We investigated the question of whether fibromyalgia is a relatively discrete clinical entity in 627 clinic patients by obtaining measures of fibromyalgia symptoms as well as physical measures of tender point counts and dolorimetry scores.

Methods

Subjects

In this study were 627 patients seen at an outpatient rheumatology centre (Wichita Arthritis Center) during a period of three and
half years from 22 February 1993 to 23 August 1996. Patients consisted of two groups, 374
patients seen before 1 August 1993 as part of a project to examine serial patients returning for
follow up visits and 253 patients seen after that date in whom the examinations were made for
the purpose of clinical diagnosis.

PHYSICAL EXAMINATION DATA
All patients underwent a count of tender points
using the 18 sites specified in the American
College of Rheumatology 1990 Classification
criteria for fibromyalgia.1 Tender point data are
reported as a count of positive tender point
sites. In addition, each patient had a dolorimetry examination performed at the tra-
pezii, knees, lateral epicondyle, and second rib
using the Fisher Dolorimeter (Pain Diagnos-
tics and Thermography, Great Neck, NY) with
a one centimetre in diameter rubber tip. A
dolorimeter is a pressure algometer. To use it,
the examiner places the rubber tip on the
examination site and gradually increases the
pressure at a rate of approximately 1 kg/cm² per
second. The patient is asked to report the
moment when the sensation at the examination
site changes from that of pressure to that of
pain. At that point, the force is recorded in kg.
The reported dolorimetry score is the mean of
the sites examined. Dolorimetry values are
thought to be a measure of pain threshold.
Dolorimetry scores represent a continuum in
the population, with median values for women
of 4.25 kg/cm² and 6.0 kg/cm² for men being
reported as a count of positive tender point
scores.2  

QUESTIONNAIRE DATA
The Clinical Health Assessment Questionnaire
(CLINHAQ) was used for each patient.3 This
instrument contains self reports for the Health
Assessment Questionnaire (HAQ) disability
index,4 arthritis impact measurement scales
(AIMS) anxiety and depression index,5 visual
analogue scale (VAS) pain, VAS global severity,
VAS gastrointestinal symptoms, VAS sleep
problems, VAS fatigue, satisfaction with health
and patient estimate of health status. In 1996,
the helplessness subscale of the rheumatology
attitudes index (RAI) was added to the CLIN-
HAQ.5 The instrument in this study included items
consider factors that are thought to be of major importance in fibromyalgia.6,7

The specific fatigue assessment used a 15 cm
double anchored VAS labelled on one end,'Fatigue is no problem' and on the other end,
‘Fatigue is a major problem.’ The question
read ‘How much of a problem has fatigue or
tiredness been for you in the past week?’ The
range of the scale is 0-3. The specific questions
and anchors for the other 15 cm VAS scales
were pain: ‘How much pain have you had
because of your illness in the past week?’ (no
pain, severe pain); global severity: ‘Consider
all of the ways that your illness affects you, rate
how you are doing by placing a mark on the
line’ (very well, very severe); sleep problems:
‘How much problem has sleep (ie, resting at
night) been for you in the past week?’ (sleep
is no problem, sleep is a major problem). Except
for global severity, which is scored 0-100, all
other VAS scales are scored 0-3.

The rheumatology distress index (RDI) is
computed from questionnaire variables
described above. It is an approximate linear
combination of questionnaire variables that
most accurately identify (a) distressed patients
and (b) those with fibromyalgia in comparison
to a large series of other questionnaire clinical,
demographic, and psychological variables.10,11

It is computed through the following formula:

\[ \text{RDI} = \left( \frac{\text{anxiety}}{9.9} + \frac{\text{depression}}{9.9} + \frac{\text{global severity}}{100} + \frac{\text{sleep disturbance}}{3} + \frac{\text{fatigue}}{3} \right) \times 20. \]

The divisors for each scale convert the variable to a
0-1 range. For example, the AIMS depression and anxiety scales have a range of 0-9.9. Dividing
by 9.9 converts the scales to 0-1. The five
variable scores are then added, producing a
scale with a range of 0-5. After multiplication
by 20 the range of scores is from 0 (no abnor-
mality on any subscale) through 100 (maximum abnormality on all subscales). In
this study, the RDI was approximately
normally distributed with a mean of 46.5 and a
standard deviation of 20.7. To test the
appropriateness of the RDI index, a new
variable that represented the first principal
component of the RDI variables (anxiety,
depression, global severity, sleep disturbance,
and fatigue) was created and then compared
with the RDI result. The correlation between
RDI and tender point count was 0.55, and the
correlation between the new principal compo-
nent variable and tender point count was 0.55.
Therefore the index is an appropriate comos-
itive measure of the five variables.

STATISTICAL ANALYSES
Data were analysed using Intercooled Stata
version 5.0 for Windows.12 Pearson correla-
tions coefficients were used. To test the equal-
ity of dependent correlations we used the
Goldstein implementation of the Fischer z
transformation.13 Data were analysed by least
squares linear regression and by lowess (locally
weighted regression) regression using a narrow

Figure 1 Graph of rheumatology distress index versus tender point count scores. Lines are
predicted lowest (locally weighted regression) lines and 95% confidence intervals. The r²
values from linear regressions are 0.30 and 0.08, respectively.
Figure 2 Graph of rheumatology distress index versus dolorimetry scores. Lines are predicted lowess (locally weighted regression) lines and 95% confidence intervals. The r² values from linear regressions are 0.30 and 0.08, respectively.

Table 1 Pearson correlation of tender point count with clinical severity and distress variables

<table>
<thead>
<tr>
<th>Tender point count</th>
<th>Dolorimetry score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tender point count</td>
<td>1.000</td>
</tr>
<tr>
<td>Rheumatology distress index</td>
<td>0.550</td>
</tr>
<tr>
<td>Dolorimetry score</td>
<td>−0.522</td>
</tr>
<tr>
<td>Fatigue scale</td>
<td>0.479</td>
</tr>
<tr>
<td>Anxiety index</td>
<td>0.458</td>
</tr>
<tr>
<td>Sleep disturbance scale</td>
<td>0.411</td>
</tr>
<tr>
<td>Pain scale</td>
<td>0.404</td>
</tr>
<tr>
<td>Global severity</td>
<td>0.399</td>
</tr>
<tr>
<td>Depression index</td>
<td>0.396</td>
</tr>
<tr>
<td>HAQ disability index</td>
<td>0.309</td>
</tr>
</tbody>
</table>

All correlation coefficients are significant at p < 0.001. * Indicates that the correlation coefficients for tender point count and dolorimetry score with the variable in the first column are different at the 0.05 level.
to recognise the importance of distress symptoms whether or not the patient reaches the fibromyalgia diagnostic threshold.

The implications of our data may be important to rheumatologists and others in the medico-legal arena where fibromyalgia is often assumed to be a discrete disease and trauma may be thought to be causally related. Our data would suggest that fibromyalgia is not a discrete disease, and that it is just as rationale to associate (or not associate) trauma with five tender points or 10 tender points or the requisite 11 or more tender points. Similarly, for basic research, there seems to be no rationale for treating fibromyalgia as a discrete disorder, and it would seem more appropriate in such studies to examine the entire range of tenderness and distress.

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