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 and distress symptoms

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. Tender point data are reported as a count of positive tender point sites. In addition, each patient had a dolorimetry examination performed at the trapezii, knees, lateral epicondyle, and second rib using the Fischer Dolorimeter (Pain Diagnostics 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 using the same Fisher dolorimeter and methodology. Among persons with fibromyalgia in a population survey, mean dolorimetry scores were approximately 2.7 kg/cm².

**QUESTIONNAIRE DATA**

The Clinical Health Assessment Questionnaire (CLINHAQ) was used for each patient. This instrument contains self reports for the Health Assessment Questionnaire (HAQ) disability index, arthritis impact measurement scales (AIMS) anxiety and depression index, 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 CLINHAQ. The variables contained in this instrument consider factors that are thought to be of major importance in fibromyalgia.

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 sleep (ie, resting at night) 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.

It is computed through the following formula:

\[
\text{rheumatology distress index} = \frac{(\text{anxiety/9.9}) + (\text{depression/9.9}) + (\text{global severity/100}) + (\text{sleep disturbance/3}) + (\text{fatigue/3})}{20}
\]

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 abnormality 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 component variable and tender point count was 0.55. Therefore the index is an appropriate composite measure of the five variables.

**STATISTICAL ANALYSES**

Data were analysed using Intercooled Stata version 5.0 for Windows. Pearson correlations coefficients were used. To test the equality of dependent correlations we used the Goldstein implementation of the Fischer z transformation. Data were analysed by least squares linear regression and by lowess (locally weighted regression) regression using a narrow
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>
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<tr>
<td>Sleep disturbance scale</td>
<td>0.411</td>
</tr>
<tr>
<td>Pain scale</td>
<td>0.404</td>
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<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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