

EVALUATION OF THE CONTINUUM HYPOTHESIS OF FIBROMYALGIA SYNDROME SEVERITY USING CURVE FITTING.

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Background & Purpose:

To test the “continuum” theory of fibromyalgia syndrome (FS). Fibromyalgia is a poorly understood chronic pain disorder characterized by widespread pain and accompanying symptoms such as fatigue, sleep disturbance, cognitive symptoms, negative mood. In 2010, the American College of Rheumatology published new criteria where FM is diagnosed using two variables: Widespread Pain Index (WPI) and Symptom Severity Score (SS Scale). This was further modified in 2011, where the symptom severity score was a composite of physician-rated severity of cognitive problems, unrefreshed sleep, fatigue and the presence of depression, abdominal cramps and headaches. Fibromyalgia is diagnosed if WPI > 7 and the SS score > 9, symptoms have been present for at least 3 months and patient does not have any other disorders to explain the pain¹. If FS is a continuum of “fibromyagianess”², and not largely present or absent, as can be interpreted from diagnostic cut-off scores, widespread pain and other clinical features should have a linear relationship. Greater widespread pain should be associated with more severe clinical features. A non-linear relationship could reflect a presence/absence of FS pathology that could optimize a diagnostic cut-off.

Methods:

Design: Exploratory correlational study using curve fitting.

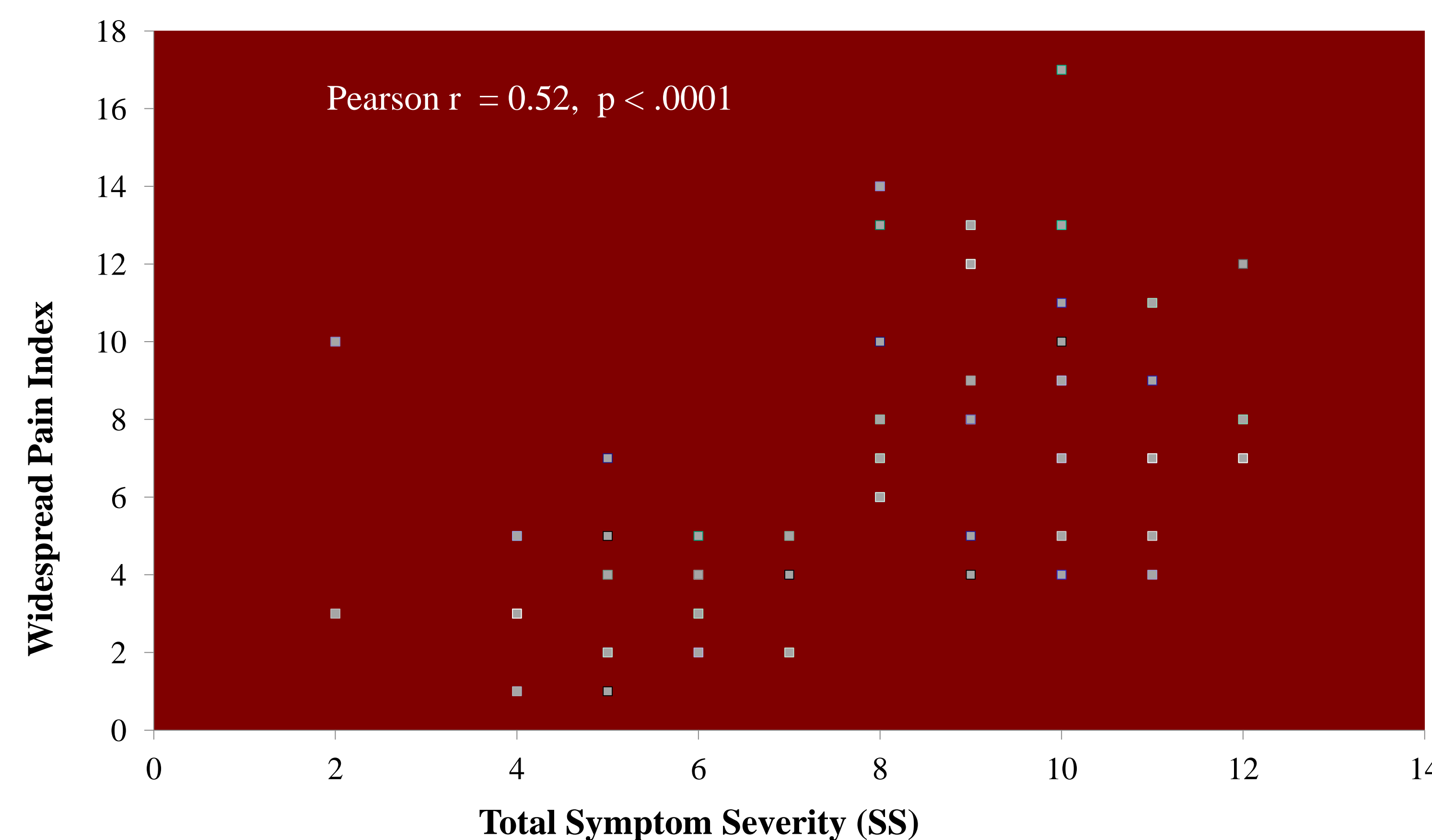
Participants: 22 male and 38 female pain patients recruited from consecutive referrals to a medical pain clinic.

Measures: Patients completed the FS New Clinical Diagnostic Criteria. The association between pain anatomical extent and other diagnostic features were studied using regression, curve estimation, and the computerized Statistical Package for the Social Sciences.

Results:

FS Total Symptom Score increased with increases in the anatomical extent of pain following a significant positive linear relationship ($p < .0001$). With the linear model, pain anatomical spread explained 28 percent of variance in FS total symptom severity scores. Non-linear curve fitting explained 24% (Exponential Model), 24% (Compound Model) and 30% (Power Model) showing no departure from the linear model (no discontinuity). Quadratic and logarithmic models showed no consistent positive versus negative correlation. Examinations of individual clinical features showed no positive linear relationship between pain anatomical extent versus headache or cognitive symptoms, very small positive linear relationships for depression (7% of variance explained), and general fatigue (16% of variance explained), and a small positive linear relationship with waking up tired (22% of variance explained). Non-linear curve fitting did not improve explained variance. The regression curves appeared linear above and below FS diagnosis cut-off scores.

Linear Association Between Widespread Pain and Total Fibromyalgia Symptom Scores



Percent of Variance in FS Total Symptom Severity Explained by Widespread Pain Using Linear and Non-Linear Models

Function/Curve	% Variance in Total Symptom Severity Explained
linear	28
exponential	24
compound	24
power	30

Linear Associations Between Individual FS Features and Widespread Pain Severity

Fibromyalgia Symptom	Pearson r Correlation	% Shared Variance With Widespread Pain
headache	0.15	12
cognitive complaints	0.35	12
depression	0.27	7
general fatigue	0.41	17
waking up tired	0.46	22

Conclusion:

These findings support the hypothesis that FS clinical features follow a continuum of severity with pain anatomical extent.

References:

1. Wolfe et al. **Fibromyalgia Criteria and Severity Scales for Clinical and Epidemiological Studies: A Modification of the ACR Preliminary Diagnostic Criteria for Fibromyalgia.** J Rheumatol 2011; 38 (6): 1113-1122.
2. Wolfe et al. **The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity.** Arth Care & Res 2010