ON THE SURFACE:
Understanding Fibromyalgia in Your Patients

Do you have patients who complain of chronic widespread pain and tenderness along with these symptoms?

- Fatigue
- Reduced functioning
- Sleep disturbance
- Morning stiffness

Could it be Fibromyalgia?

- Fibromyalgia is the most common chronic widespread pain condition in the US
- According to national epidemiologic studies, millions of Americans suffer from Fibromyalgia
- The American College of Rheumatology (ACR) has developed specific criteria to diagnose Fibromyalgia

Is Fibromyalgia "all in their heads"?

Yes, it is in their heads—but emerging sciences suggest it is not psychosomatic

- Fibromyalgia is thought to be a neurologic condition
- Central sensitization is a leading theory—a dysfunctional hyperexcitability in pain processing

Emerging evidence suggests:

- Pain processing that is dysfuctional, possibly leading to a lower pain threshold
- Elevated levels of substance P and its role in the transmission of pain to the central nervous system
- Anatomical gray matter changes in the brain, possibly associated with Fibromyalgia

Exploring the Science Behind the Pain

FIBROMYALGIA:

A STEP FORWARD:

Diagnosing and Managing Fibromyalgia

Identifying Fibromyalgia Patients

Fibromyalgia symptoms include:

- Chronic widespread pain and tenderness
- Fatigue
- Morning stiffness
- Reduced functioning
- Sleep disturbance

American College of Rheumatology Criteria for Diagnosing Fibromyalgia

- Presence of widespread pain for at least 3 months, and all of the following:
  1. Pain on the right side of the body
  2. Pain on the left side of the body
  3. Pain in the pelvic region
  4. Pain on palpation in at least 11 of 18 tender points

A debilitating condition that affects daily functioning

- Painful tenderness that is often tender to palpation, possibly leading to a lower pain threshold
- Elevated levels of substance P and its role in the transmission of pain to the central nervous system
- Anatomical gray matter changes in the brain, possibly associated with Fibromyalgia

Recognizing the symptoms and diagnosing patients with Fibromyalgia can help you provide them with meaningful pain relief and improvements in function

References:
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Is Fibromyalgia “all in their heads”?

Yes, it is in their heads—but emerging science suggests it is not psychosomatic.

Emerging evidence suggests:

- Anatomical gray matter changes in the brain, possibly associated with Fibromyalgia.
- Elevated levels of substance P and its role in the transmission of pain to the central nervous system.
- Pain processing that is dysfunctional, possibly leading to a lower pain threshold.
- The American College of Rheumatology (ACR) has developed specific criteria to diagnose Fibromyalgia.
- According to national epidemiological studies, millions of Americans suffer from Fibromyalgia.
- Fibromyalgia is the most common chronic widespread pain condition in the US.
- Over 60% of Fibromyalgia sufferers reported difficulty in recent quantitative survey (N=1735):
  - Morning stiffness
  - Fatigue
  - Sleep disturbance
  - Chronic widespread pain and tenderness
  - Reduced functioning
  - Pain above and below the waist
  - Pain in the axialskeleton
  - Pain on palpation in at least 11 of 18 tender points

A Step Forward:

Recognizing the symptoms and diagnosing patients with Fibromyalgia can help you provide them with meaningful pain relief and improvements in function.

Identifying Fibromyalgia Patients

Fibromyalgia symptoms include:

- Chronic widespread pain and tenderness
- Fatigue
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Criteria for Diagnosing Fibromyalgia

- Presence of widespread pain for at least 3 months, and all of the following:
  1. Pain on the right and left sides of the body
  2. Pain below the waist
  3. Pain in the axial skeleton
  4. Pain on palpation in at least 11 of 18 tender points

A debilitating condition that affects daily functioning

- Widespread pain is reported by more than 97% of patients with Fibromyalgia.
- Over 60% of Fibromyalgia sufferers reported difficulty in a recent quantitative survey (N=1735):
  - Morning stiffness
  - Fatigue
  - Sleep disturbance
  - Reduced functioning

References:

4. Goodwin & Gilman’s The Pharmacological Basis of Therapeutics: 11th ed.
6. Pain above and below the waist
7. Pain in the axialskeleton
8. Pain on palpation in at least 11 of 18 tender points
Patients with Fibromyalgia have a significantly lower pain threshold, as shown in an fMRI study.

**Patients with Fibromyalgia have a significantly lower pain threshold, as shown in an fMRI study.**

Adapted from Gracely et al.

Patients with Fibromyalgia had a significantly lower pain threshold, as shown in an fMRI study. 2

For healthy control patients to experience the same high level of pain as Fibromyalgia patients, nearly double the stimulus intensity was required (4.16 kg/cm²).

**Patients with Fibromyalgia had a significantly lower pain threshold, as shown in an fMRI study.**

Adapted from Gracely et al.

In multiple studies, levels of substance P have been shown to be significantly higher in the cerebrospinal fluid (CSF) of Fibromyalgia patients than in normal controls. 5-7

- Substance P is a neurotransmitter, may play a key role in the transmission of pain to the central nervous system.
- Patient-reported pain measures correlated with fMRI scans.
- Elevated Levels of Substance P
- Within the CSF:
- Anatomical Changes

**Elevated Levels of Substance P**

*Substance P is a neurotransmitter, may play a key role in the transmission of pain to the central nervous system.*

*Patient-reported pain measures correlated with fMRI scans.*

**Within the CSF:**

- Elevated Levels of Substance P
- Anatomical Changes

**Anatomical Changes**

- Accumulating evidence now suggests that Fibromyalgia may be associated with anatomical changes in the brain. 12

1. In the Klausch et al study, patients with Fibromyalgia appeared to have significantly less gray matter volume and total brain volume than healthy controls.
2. Gray matter loss occurred in regions of the brain related to pain processing.
3. Gray matter loss was related to age and to disease duration vs healthy controls.
4. It is undetermined whether the structural changes observed in these patients cause or are caused by their Fibromyalgia.

**INSIDE THE BRAIN:**

**Patient-reported pain measures correlated with fMRI scans**

*For healthy control patients to experience the same high level of pain as Fibromyalgia patients, nearly double the stimulus intensity was required.*

Adapted from Gracely et al. *Arthritis Rheum.* 2002

**Neuroanatomical changes suggest that Fibromyalgia may be associated with central nervous system dysfunction**

*These neuroanatomical changes suggest that Fibromyalgia may be associated with central nervous system dysfunction.*

Adapted from Gracely et al. *Arthritis Rheum.* 2002

**Fibromyalgia patients had accelerated gray matter loss related to age and to disease duration vs healthy controls.**
**A CLOSER LOOK:**

**Dysfunctional Pain Processing**

**Patients with Fibromyalgia have a significantly lower pain threshold, as shown in an fMRI study.**

*Adapted from Gracely et al.*

For healthy control patients to experience the same high level of pain as Fibromyalgia patients, nearly double the stimulus intensity was required. 4

<table>
<thead>
<tr>
<th>Patient-Reported Pain Intensity of 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulus Intensity:</td>
</tr>
</tbody>
</table>

Results:

- Patients with Fibromyalgia had a significantly lower pain threshold.

**Elevated Levels of Substance P**

**Patients taking opioid analgesics were excluded; other analgesics were discontinued 12 hours before procedures.**

Method:

- After establishment of the study subjects’ pain sensitivity, fMRI scans were made during a series of test cycles. During each cycle, 10 seconds of painful pressure, both groups exhibited a decreased cerebral blood flow below the level of pain in the same region of the brain.

Patient-reported pain measures correlated with fMRI scans:

- In multiple studies, levels of substance P have been shown to be significantly higher in the cerebrospinal fluid (CSF) of Fibromyalgia patients than in normal controls. 5-7

**INSIDE THE BRAIN:**

**Anatomical Changes**

Accumulating evidence now suggests that Fibromyalgia may be associated with anatomical changes in the brain. 8-12

- In the Kuchinad et al study, patients with Fibromyalgia appeared to have significantly less gray matter volume and total brain volume than healthy controls. 9
- Gray matter loss occurred in regions of the brain related to pain processing.
- Gray matter loss was related to age and to disease duration vs healthy controls.
- It is undetermined whether the structural changes observed in these patients cause or are caused by their Fibromyalgia.

**Age-related gray matter loss was accelerated in Fibromyalgia patients and was correlated with disease duration.**

These neuroanatomical changes suggest that Fibromyalgia may be associated with central nervous system dysfunction. 9-12

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**Table:**

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Substance P Level (fmol/mL)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy Controls</td>
<td>4.03 ± 0.56</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Fibromyalgia Patients</td>
<td>5.60 ± 0.78</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

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*FMRI = functional magnetic resonance imaging.*

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**fMRI:** functional magnetic resonance imaging.
**A CLOSER LOOK:**

**Dysfunctional Pain Processing**

Patients with Fibromyalgia have a significantly lower pain threshold, as shown in an fMRI study.

**Elevated Levels of Substance P**

In multiple studies, levels of substance P have been shown to be significantly higher in the cerebrospinal fluid (CSF) of Fibromyalgia patients than in normal controls:

- Substance P is a neurotransmitter, may play a key role in the transmission of pain to the central nervous system.

For healthy control patients to experience the same high level of pain as Fibromyalgia patients, nearly double the stimulus intensity was required (4.16 kg/cm²).

**Accumulating evidence now suggests that Fibromyalgia may be associated with central nervous system dysfunctions.**

**Anatomical Changes**

- In the Klawans et al study, patients with Fibromyalgia appeared to have significantly less gray matter volume and total brain volume than healthy controls.
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**IN THE BRAIN:**

**Native gray matter volume (mm³)**

- Fibromyalgia patients had accelerated gray matter loss related to age and to disease duration vs healthy controls.

**Patient-reported pain intensity**

<table>
<thead>
<tr>
<th>Time since diagnosis (yrs)</th>
<th>Healthy controls</th>
<th>Fibromyalgia patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs)</td>
<td>Healthy controls</td>
<td>Fibromyalgia patients</td>
</tr>
<tr>
<td>20</td>
<td>600,000</td>
<td>575,000</td>
</tr>
<tr>
<td>30</td>
<td>550,000</td>
<td>525,000</td>
</tr>
<tr>
<td>40</td>
<td>500,000</td>
<td>475,000</td>
</tr>
<tr>
<td>50</td>
<td>450,000</td>
<td>425,000</td>
</tr>
<tr>
<td>60</td>
<td>400,000</td>
<td>375,000</td>
</tr>
</tbody>
</table>

**Results:**

- Gray matter volume was significantly correlated with age and disease duration.
- Gray matter loss was related to age and disease duration vs healthy controls.

**FIBROMYALGIA PATIENTS**

- Russell 1995
  - P = .001
  - (n=30)

**HEALTHY CONTROL SUBJECTS**

- Russell 1995
  - (n=24)

![Image](https://example.com/image.png)

**Objective:** To measure levels of substance P in patients with Fibromyalgia.

**Method:** The CSF levels of substance P were measured in patients diagnosed with Fibromyalgia and in healthy controls.

**Results:** Substance P levels were significantly elevated in patients with Fibromyalgia as compared to healthy controls.

**Correlates:**

- Substance P concentration (fmoles/mL) was significantly higher in Fibromyalgia patients compared to healthy controls.

**INSIDE THE BRAIN:**

**Anatomical Changes**

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**Objective:** To evaluate patterns of cerebral activation during application of painful pressure in Fibromyalgia patients versus controls.

**Method:**

- Brain images taken from Fibromyalgia patients were compared to those taken from healthy controls.
- Statistical maps of differences in gray matter density between patients and healthy controls were created.

**Results:**

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**INTRODUCTION TO FIBROMYALGIA:**

- Fibromyalgia is a chronic, widespread pain condition characterized by widespread pain, fatigue, and other symptoms.

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*See last page for ACR criteria.

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3 points on the right and left side of the body
2 points on each side of the spine

Diagnosing and Managing Fibromyalgia

• A step forward: 1994;37:1593-1601.

Fibromyalgia syndrome.


Abnormal brain regional cerebral blood flow (rCBF) and cerebrospinal fluid (CSF) levels of substance P (SP) in patients and non-patients with fibromyalgia (FM).

References:


