Defining TMD for Clinical Care

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Overlapping Chronic Pain Conditions: Implications for Diagnosis and Classification

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Abstract: There is increasing recognition that many if not most common chronic pain conditions are heterogeneous with a high degree of overlap or coprevalence of other common pain conditions along with influences from biopsychosocial factors. At present, very little attention is given to the high degree of overlap of many common pain conditions when recruiting for clinical trials. As such, many if not most patients enrolled into clinical studies are not representative of most chronic pain patients. The failure to account for the heterogeneous and overlapping nature of most common pain conditions

Chronic Overlapping Pain Conditions

- Most highly prevalent pain conditions in individuals under age 50
  - **Fibromyalgia**
  - **Chronic fatigue syndrome**
  - Irritable bowel
  - TMJ Disorder
  - Headache
  - Interstitial cystitis
  - Low back pain
  - Endometriosis
  - Vulvodynia
- Same central mechanisms play significant roles in all pain conditions, even those with known peripheral contributions

Evolution of Thinking Regarding Fibromyalgia

American College of Rheumatology (ACR) Criteria

- Discrete illness
- Focal areas of tenderness
- Pathophysiology poorly understood and thought to be psychological in nature

- Chronic widespread pain
- Tenderness in ≥11 of 18 tender points

- Final common pathway (i.e. pain centralization)
- Part of a much larger continuum
- Not just pain
- Pathophysiology fairly well understood and is a CNS process that is independent from classic psychological factors

Mechanistic Characterization of Pain

Variable degrees of any mechanism can contribute in any disease

	Nociceptive	Neuropathic
Cause	Inflammation or damage	Nerve damage or entrapment
Clinical features	Pain is well localized, consistent effect of activity on pain	Follows distribution of peripheral nerves (i.e. dermatome or stocking/glove), episodic, lancinating, numbness, tingling
Screening tools		PainDETECT
Treatment	NSAIDs, injections, surgery, ? opioids	Local treatments aimed at nerve (surgery, injections, topical) or CNS-acting drugs
Classic examples	Osteoarthritis Autoimmune disorders Cancer pain	Diabetic painful neuropathy Post-herpetic neuralgia Sciatica, carpal tunnel syndrome

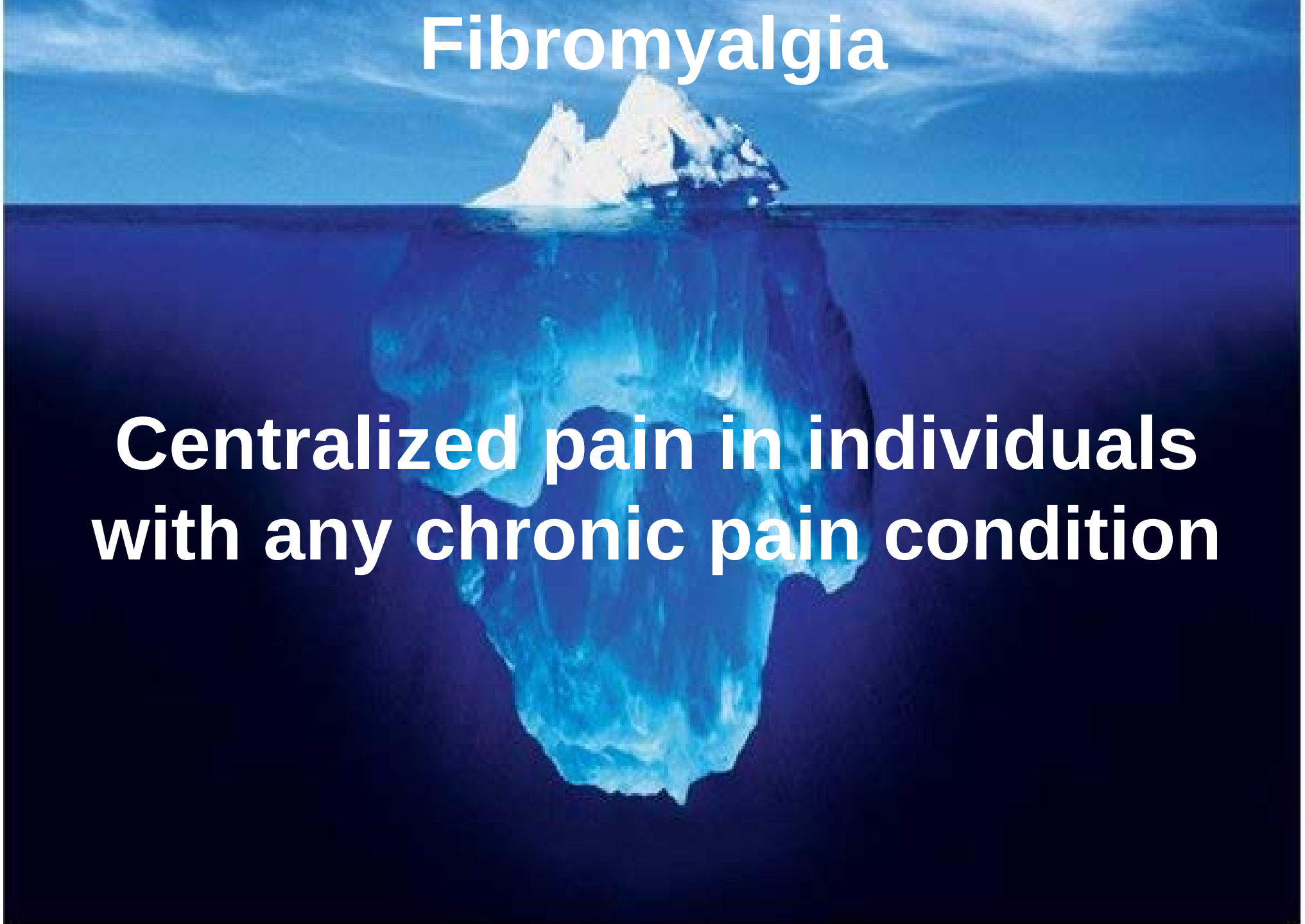
Mixed Pain State

Fibromyalgia-ness

- Term coined by Wolfe to indicate that the symptoms of FM occur as a continuum in the population rather than being present or absent [1]
- In rheumatic disorders such as osteoarthritis, rheumatoid arthritis, lupus, low back pain, etc. this score is more predictive of pain levels and disability than more objective measures of disease [2,3]
- Domain overlaps with somatization in many regards, and there are many questionnaires that collect somatic symptom counts as a surrogate for this construct

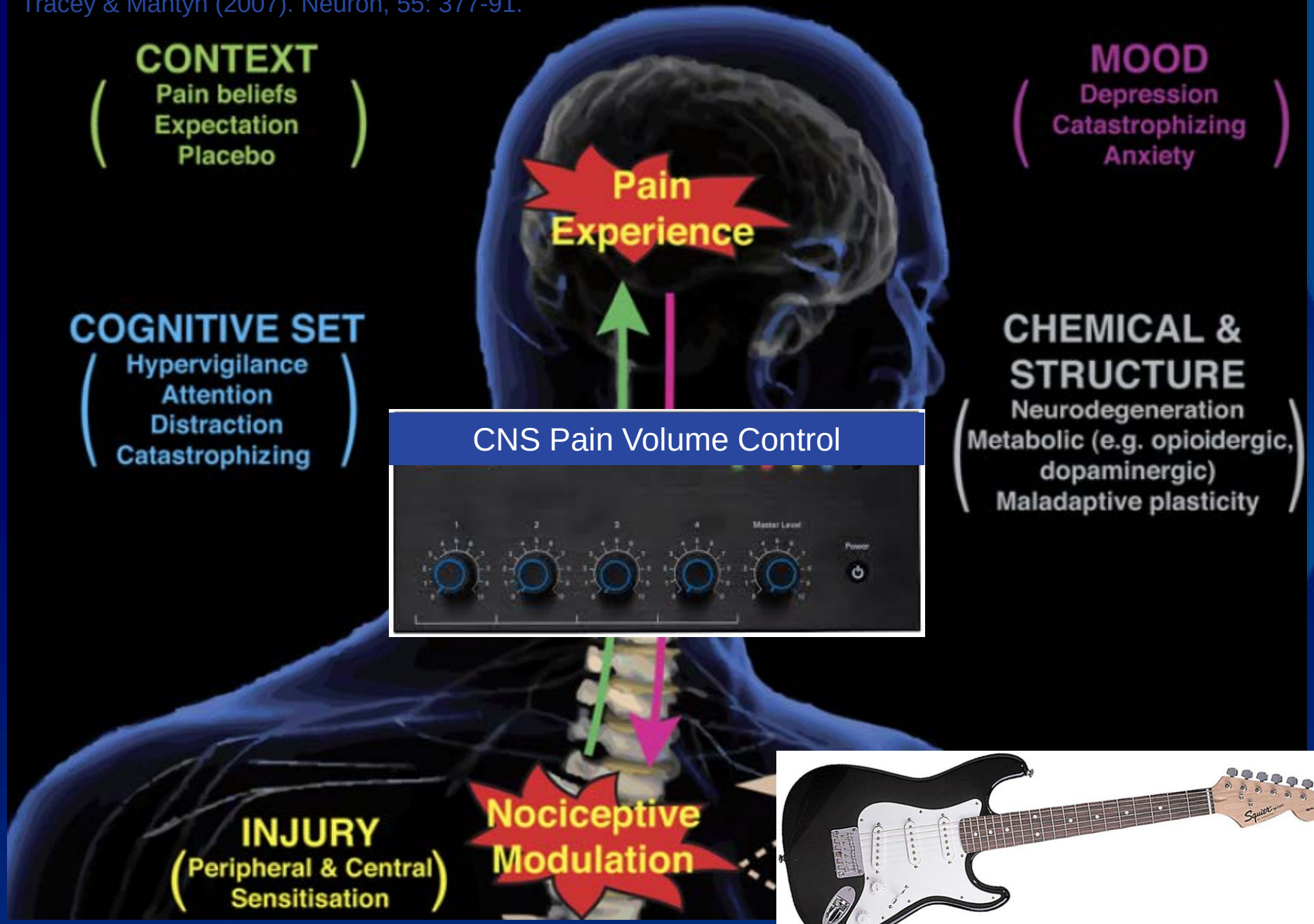
1.Wolfe et. al. *Arthritis Rheum.* Jun 15 2009;61(6):715-716. 2. Wolfe et. al. *2.J Rheumatol.* Feb 1 2011. 3. Clauw DJ. JAMA, 2014.

Fibromyalgia



Centralized pain in individuals with any chronic pain condition

Tracey & Mantyh (2007). Neuron, 55: 377-91.



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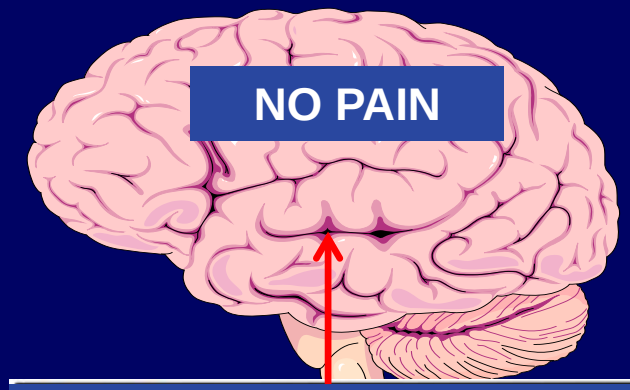
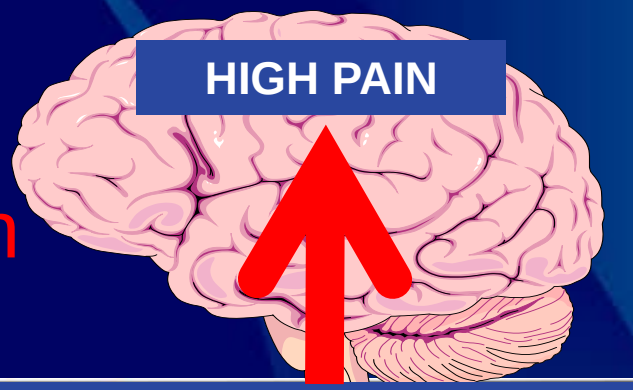


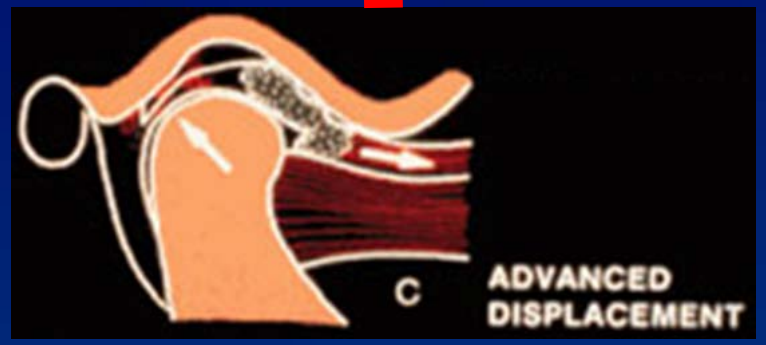
CNS Pain Volume Control
Low Setting

Central pain signals



CNS Pain Volume Control
High Setting

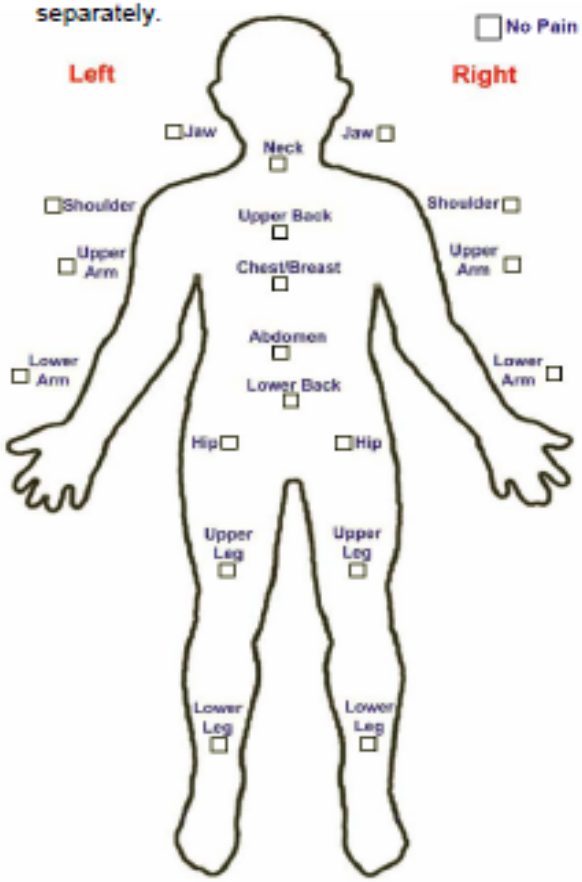
Peripheral pain signals



Concept of “Fibromyalgia-ness”

Fibromyalgia Symptoms (Modified ACR 2010 Fibromyalgia Diagnostic Criteria)

1. Please indicate below if you have had pain or tenderness over the past 7 days in each of the areas listed below. Check the boxes in the diagram below for each area in which you have had pain or tenderness. Be sure to mark right and left sides separately.



2. Using the following scale, indicate for each item your severity over the past week by checking the appropriate box.

No problem
Slight or mild problems: generally mild or intermittent
Moderate: considerable problems; often present and/or at a moderate level
Severe: continuous, life-disturbing problems

	No problem	Slight or mild	Moderate	Severe
a. Fatigue	☐	☐	☐	☐
b. Trouble thinking or remembering	☐	☐	☐	☐
c. Waking up tired (unrefreshed)	☐	☐	☐	☐

3. During the past 6 months have you had any of the following symptoms?

	No	Yes
a. Pain or cramps in lower abdomen	☐	☐
b. Depression	☐	☐
c. Headache	☐	☐

4. Have the symptoms in questions 2-3 and pain been present at a similar level for at least 3 months? **No** ☐ **Yes** ☐

5. Do you have a disorder that would otherwise explain the pain? **No** ☐ **Yes** ☐

1. Wolfe et. al. *Arthritis Rheum.* Jun 15 2009;61(6):715-716. 2. Wolfe et. al. *J Rheumatol.* Feb 1 2011. 3. Clauw DJ. JAMA, 2014.

Centralization Continuum

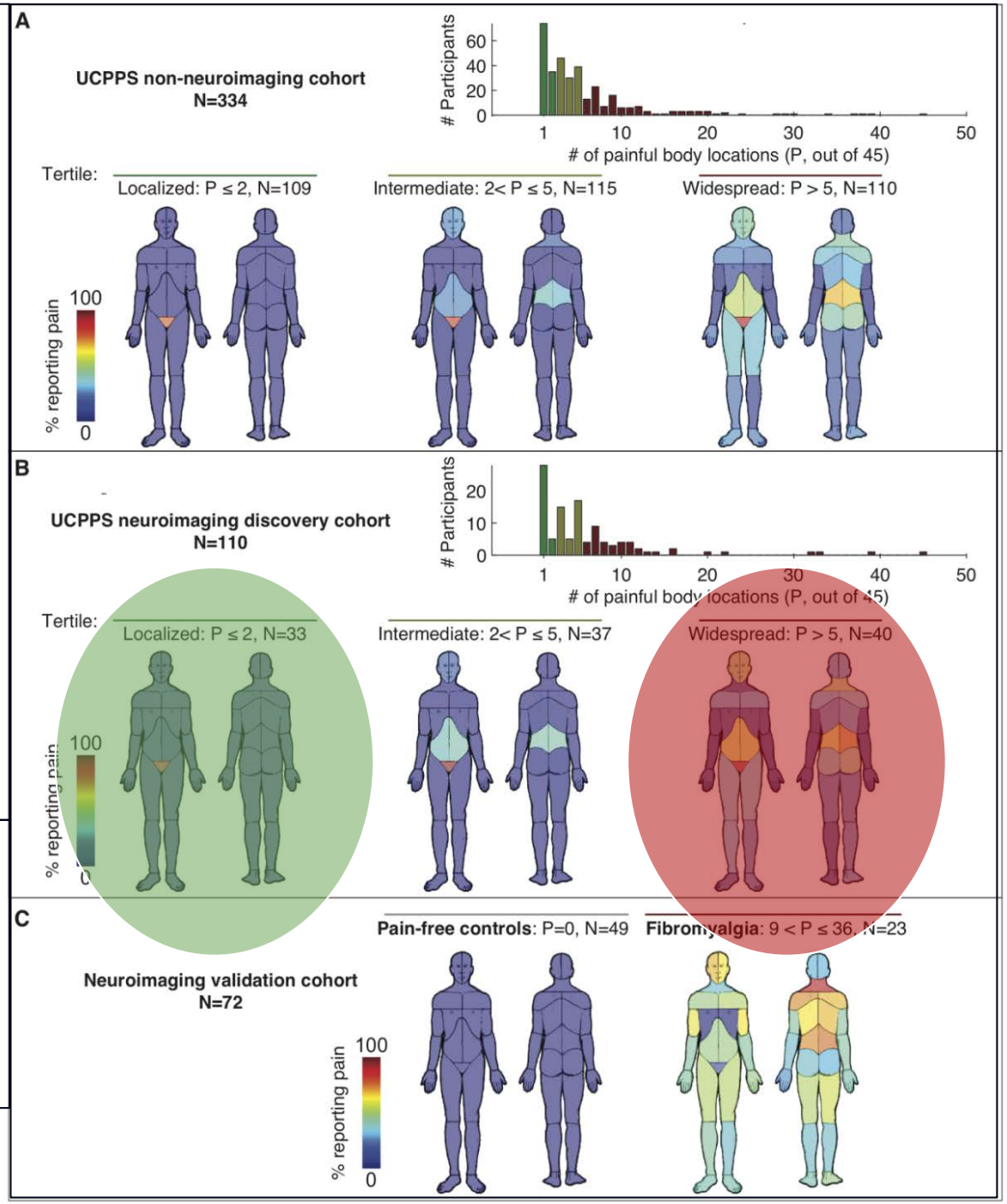
Proportion of individuals in chronic pain states that have centralized their pain

Interstitial Cystitis Tertiles of body pain distribution: local, intermediate, widespread

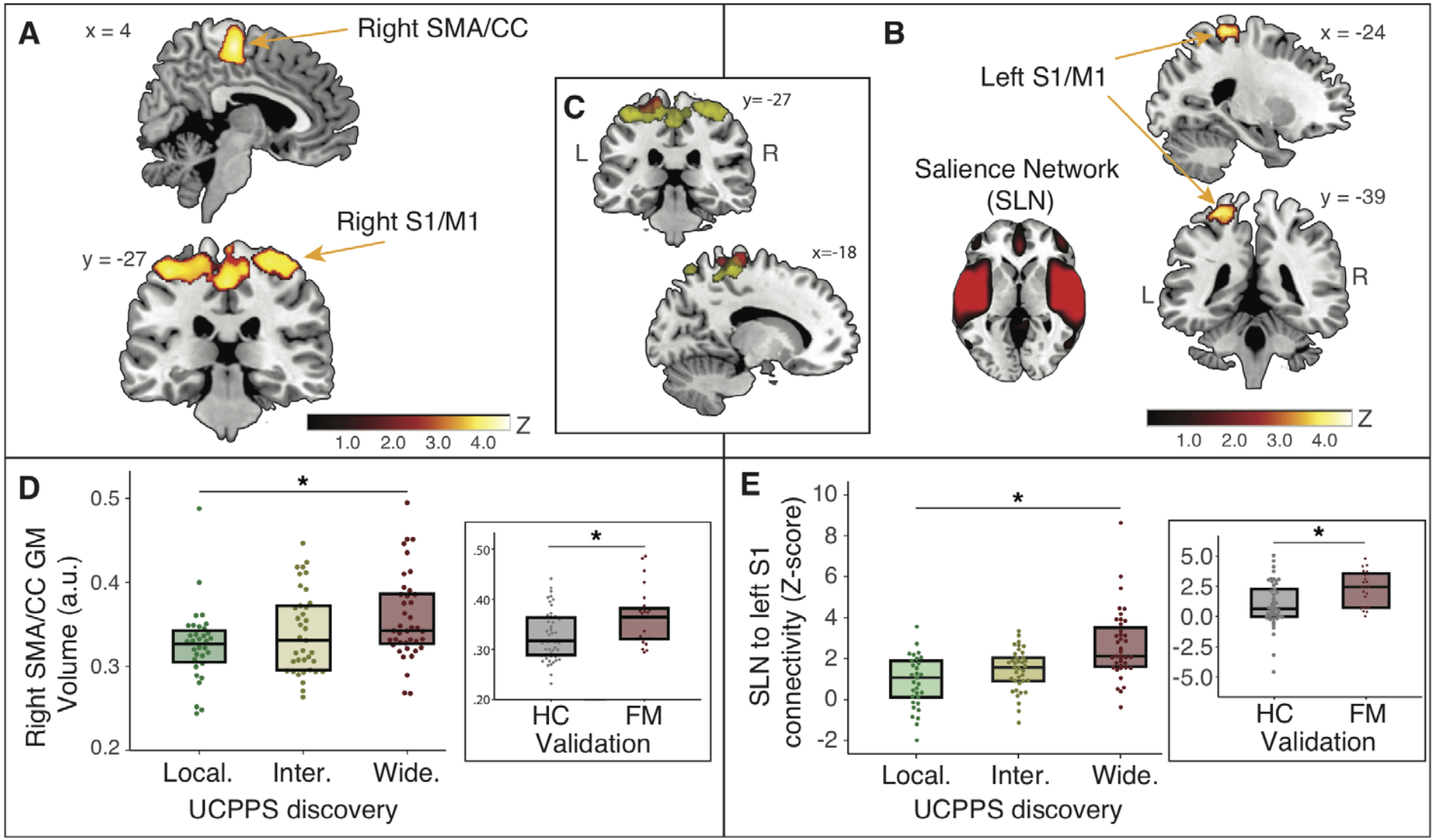
Non-Neuroimaging (N=334)

Neuroimaging (N=110)

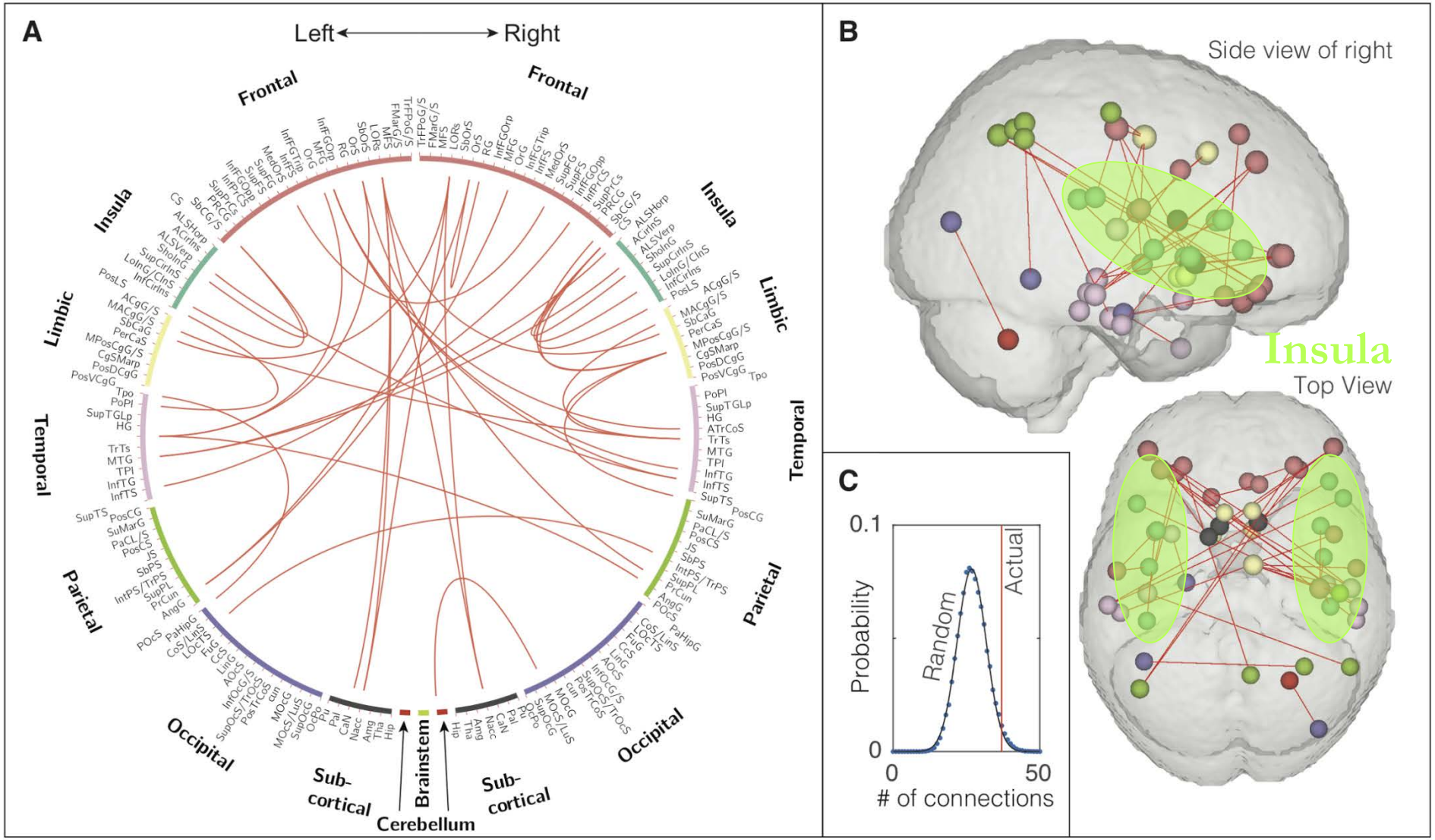
Validation FM (N=23) HC (N=49)



Increased Gray Matter Volume *in* and Connectivity *to* Sensory Cortex In Widespread Pain



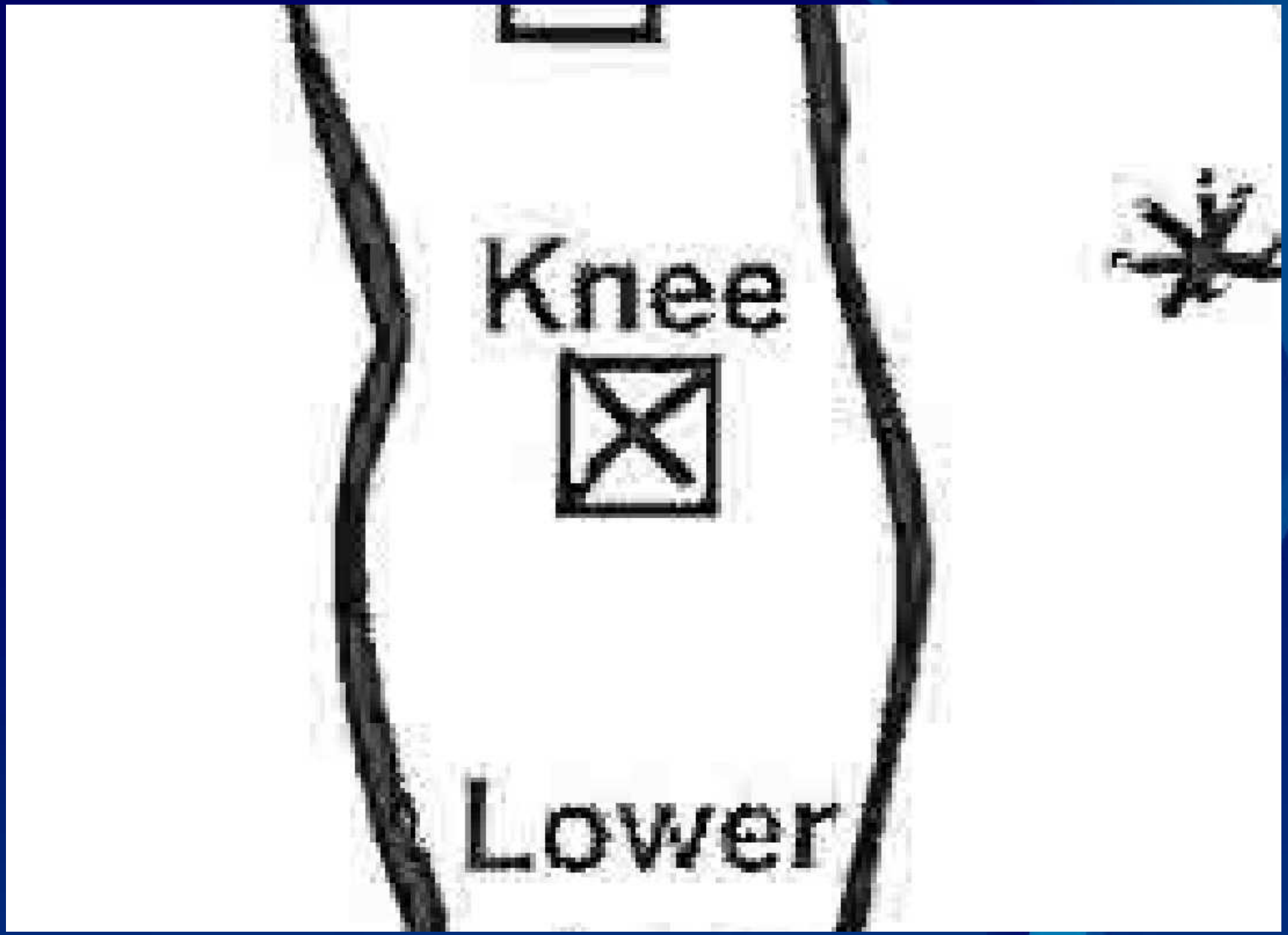
Neurological Signature of Widespread Pain Includes Sensory and Insular Cortices

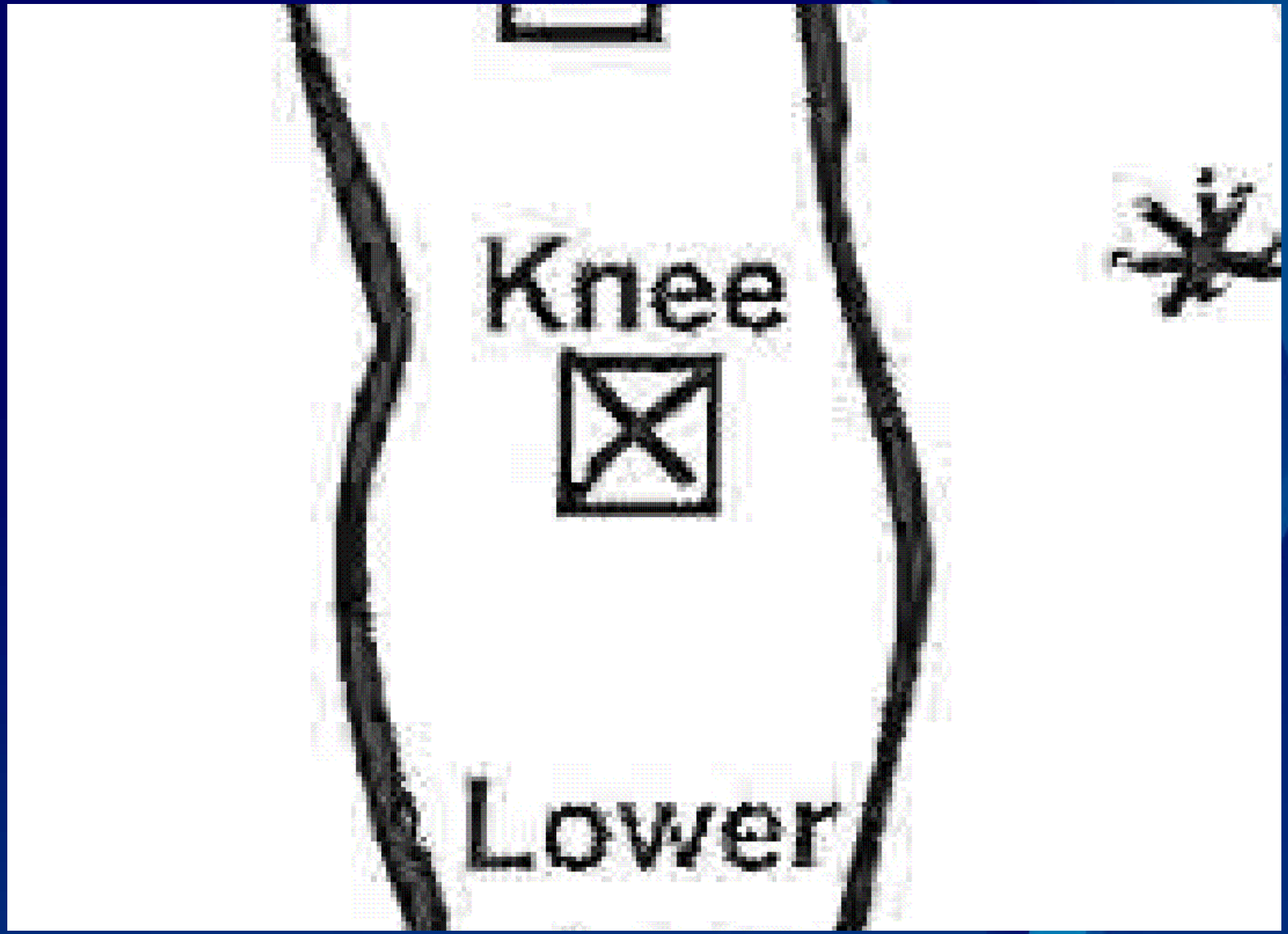


Sub-threshold FM is Highly Predictive of Surgery and Opioid Non-responsiveness in Patients Undergoing Arthroplasty and Hysterectomy

- Primary hypothesis of studies is the measures of centralized pain in OA (FMness) will predict failure to respond to arthroplasty and hysterectomy
- Extensive preoperative phenotype using validated self-report measures of pain, mood, and function
- Two outcomes of interest:
  - Postoperative opioid consumption
  - Pain relief from procedure at 6 months

1. Brummett, C.M., et al., Anesthesiology, 2013. **119**(6): p. 1434-43.
2. Brummett, C.M., et al., Arthritis Rheumatol, 2015. 67(5):1386-94.
3. Janda, A.M., et al., Anesthesiology, 2015. **122**(5): p. 1103-11.

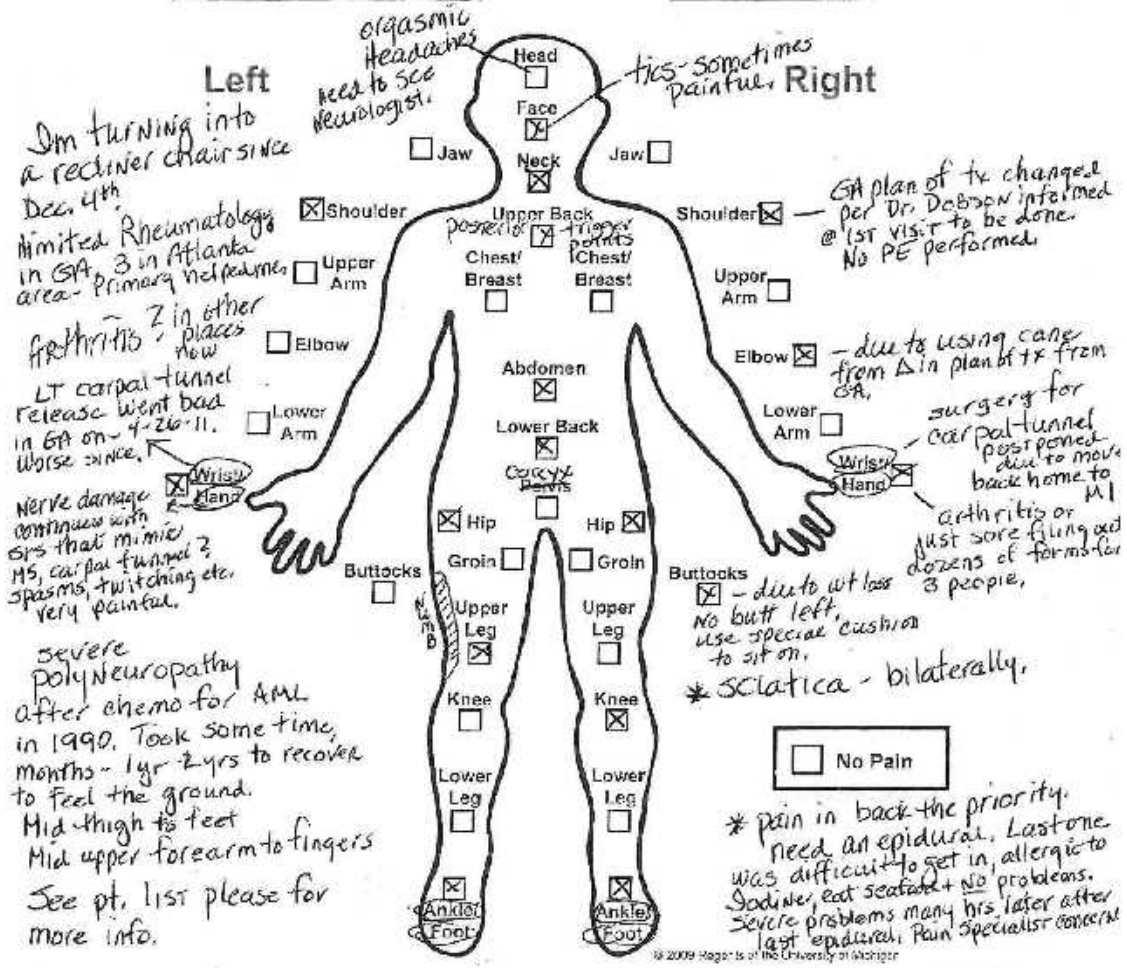

Knee
Lower


Knee
Lower

UNIVERSITY OF MICHIGAN HOSPITALS & HEALTH CENTERS	NAME
Anesthesiology	REG NO.
New Patient Questionnaire - Back and Pain Center	BIRTHDATE

Michigan Body Map

On the image below identify **all** the areas of your body where you have felt ***persistent or recurrent pain*** present for the last ***3 months or longer***.

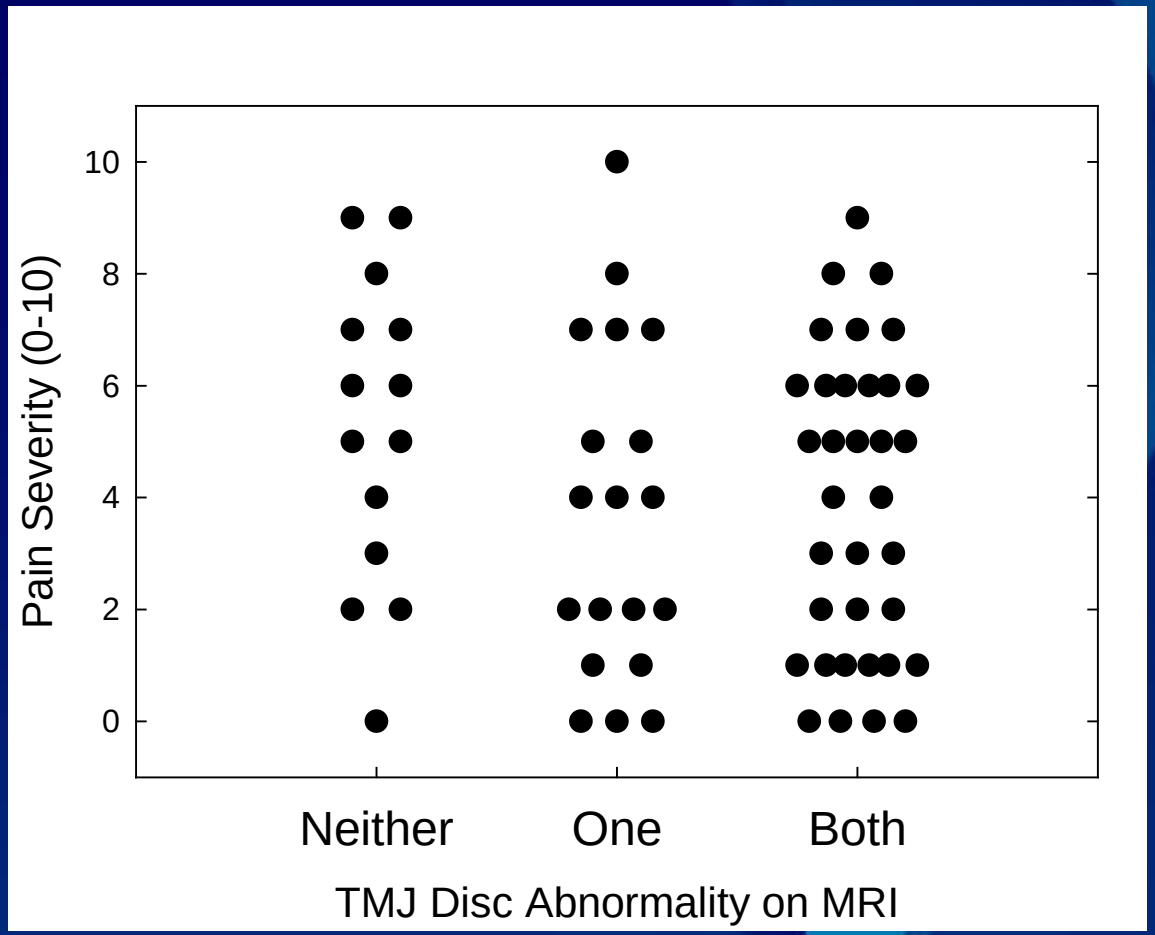


Dm turning into a recliner chair since Dec. 4th.
limited Rheumatology in GA, 3 in Atlanta area- Primary not pediatric
Arthritis - 2 in other places now
LT carpal tunnel release went bad in GA on ~ 4-26-11. Worse since.
Nerve damage continues with Grs that mimic MS, carpal tunnel ? spasms, twitching etc. very painful.
severe PolyNeuropathy after chemo for AML in 1990. Took some time, months ~ 1yr 2yrs to recover to feel the ground.
Mid thigh to feet
Mid upper forearm to fingers
See pt. list please for more info.
GA plan of tx changed per Dr. Dobson informed @ 1ST visit to be done. No PE performed.
- due to using cane from Δ in plan of tx from GA.
surgery for carpal tunnel postponed due to move back home to MI
arthritis or just sore typing and dozens of forms for 3 people.
Buttocks - due to wt loss No butt left, use special cushion to sit on.
* Sciatica - bilaterally.
* pain in back the priority. need an epidural. Last one was difficult to get in, allergic to Iodine, eat seafood + No problems. Severe problems many hrs later after last epidural. Pain Specialist concerns

5[illegible]10C04	VER: 8/11 HIM: 07/1[illegible]	Medical Record	M	New Patient Questionnaire - Back and Pain Center

Mismatch Between Injury and Pain

- Collaboration with S. Aronovich, DMD
- Prospective study on patients being treated for TMD
- n=68 with MRI of temporomandibular joints

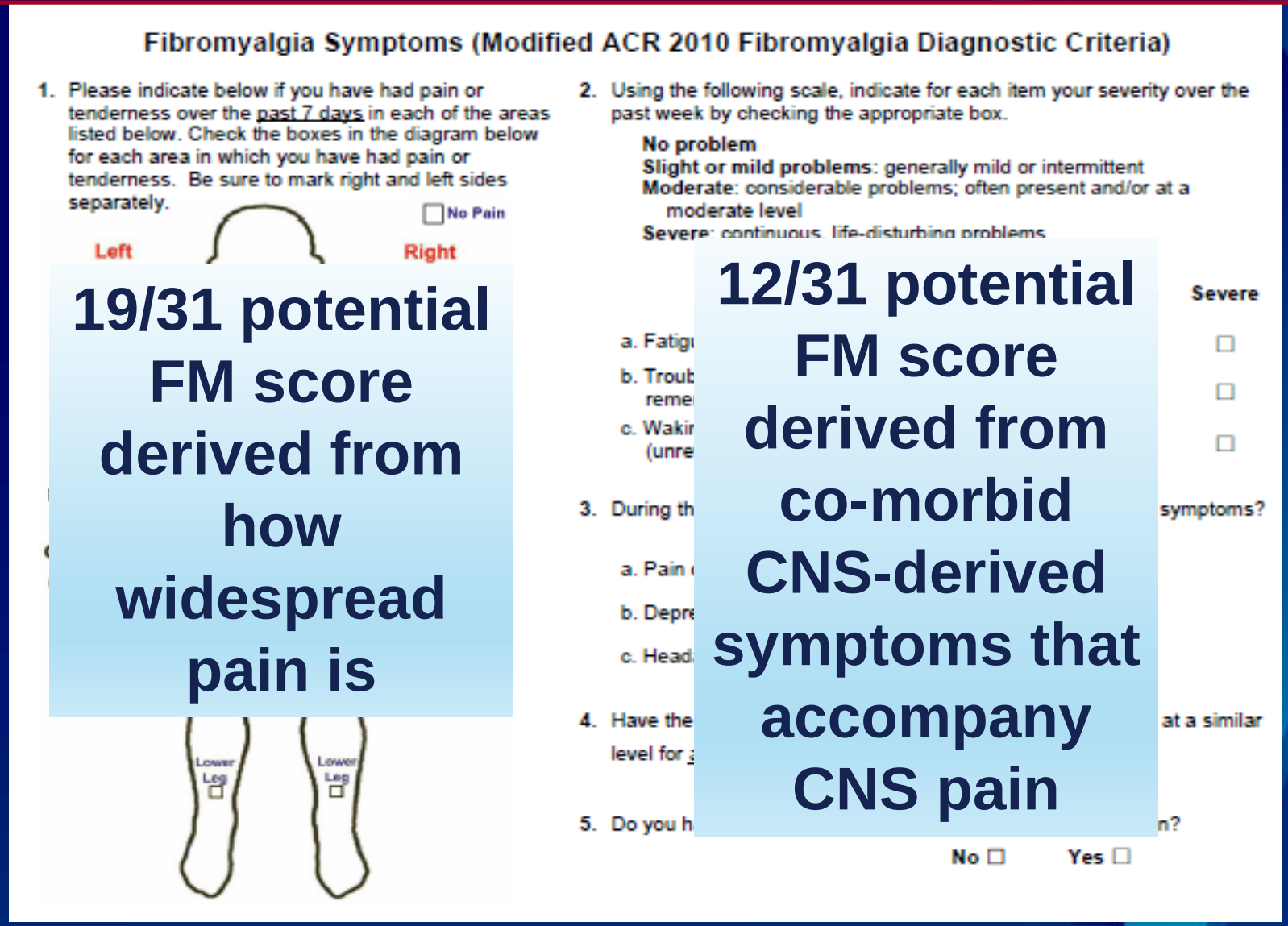


Harper et al. (Manuscript in preparation)

Variables Analyzed

- Age
- Sex
- Surgery (Knee vs Hip)
- Primary anesthetic (GA vs neuraxial)
- Home opioids (IVME)
- Pain severity (BPI)
  - Overall
  - Surgical site
- Neuropathic pain score (PainDETECT)
- Depression (HADS)
- Anxiety (HADS)
- Catastrophizing
- Physical function-WOMAC

“Fibromyalgia-ness” can be scored 0-31



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No Pain

Left Right

Lower Leg Lower Leg

2. Using the following scale, indicate for each item your severity over the past week by checking the appropriate box.

No problem
Slight or mild problems: generally mild or intermittent
Moderate: considerable problems; often present and/or at a moderate level
Severe: continuous, life-disturbing problems

Severe

a. Fatigu ☐
b. Troub ☐
reme
c. Wakir ☐
(unre

3. During th symptoms?

a. Pain (
b. Depre
c. Head

4. Have the at a similar level for

5. Do you h n?

No ☐ Yes ☐

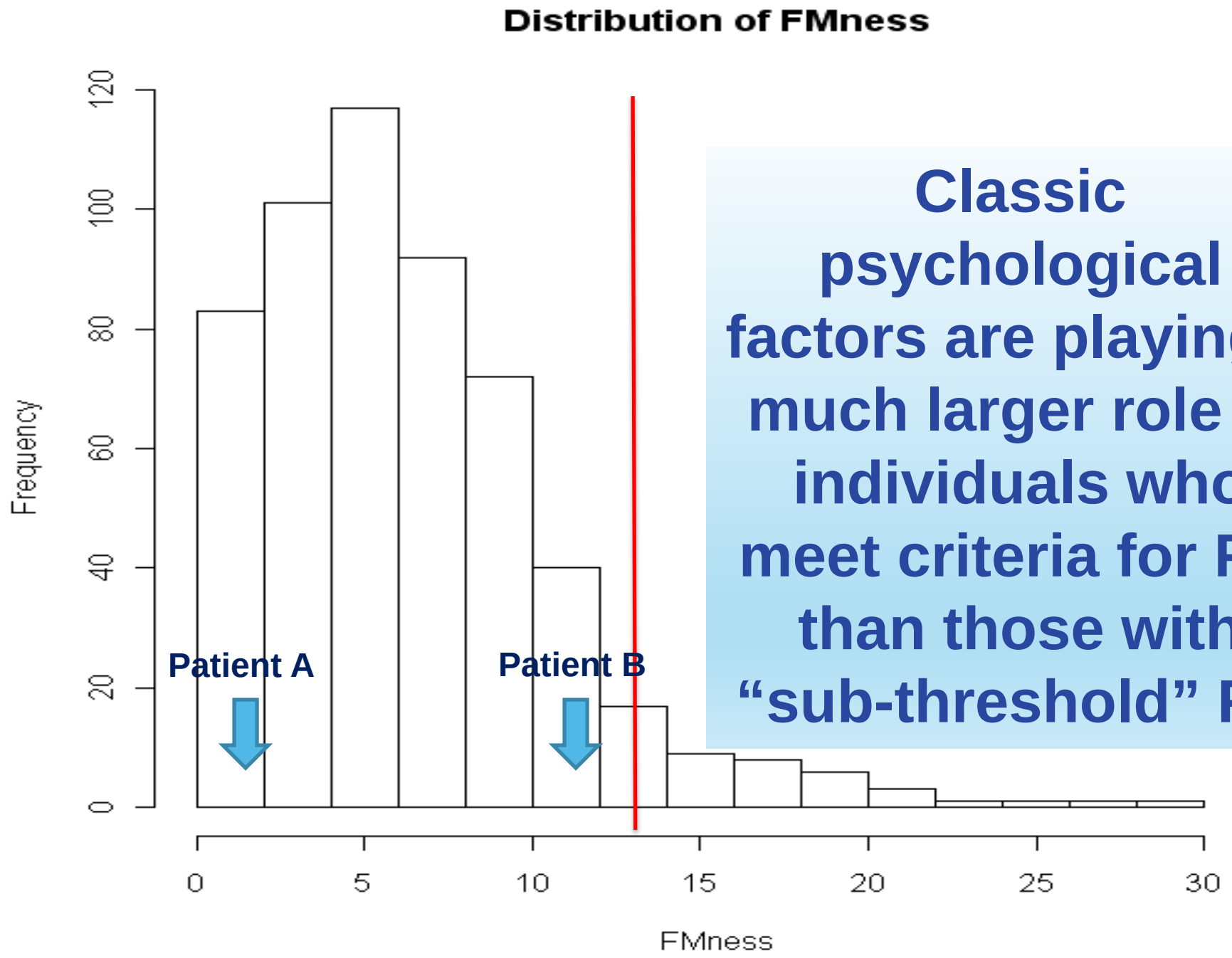
19/31 potential FM score derived from how widespread pain is

12/31 potential FM score derived from co-morbid CNS-derived symptoms that accompany CNS pain

1. Wolfe et. al. *Arthritis Rheum.* Jun 15 2009;61(6):715-716. 2. Wolfe et. al. *J Rheumatol.* Feb 1 2011. 3. Clauw DJ. JAMA, 2014.

Each one point increase in fibromyalgianess led to:

- 9 mg greater oral morphine requirements during acute hospitalization (8mg greater when all individuals taking opioids as outpatients excluded)
- 20 – 25% greater likelihood of failing to respond to knee or hip arthroplasty (judged by either 50% improvement in pain or much better or very much better on patient global)
- These phenomenon were linear across entire scale up to a score of approximately 18 - and equally strong after individuals who met criteria for FM were excluded
- This phenomenon was much stronger than and largely independent of classic psychological factors



Classic psychological factors are playing a much larger role in individuals who meet criteria for FM than those with "sub-threshold" FM

Arthroscopic Surgery in TMD

- After controlling for baseline pain, those who had WPI <3 had significantly more improvement in their pain after intervention compared to those with WPI ≥ 3 (R^2= .586, p<.05)

Carver, Harper, Aronovich (Manuscript in Preparation)

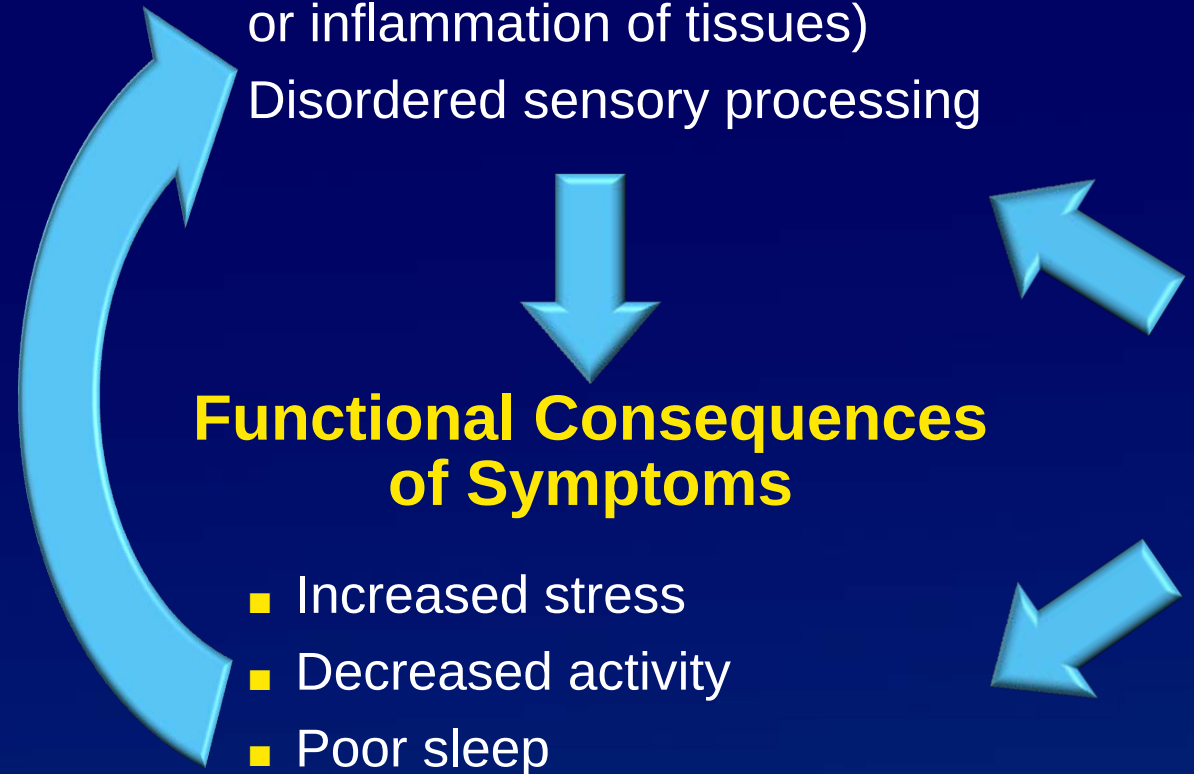
Treating Based on Mechanisms

Any combination may be present

	Peripheral (nociceptive)	Neuropathic	Centralized Pain
NSAIDs	+	-	-
Opioids	+	+	-
Surgery/ Injections	+	+	-
Tricyclics	+	+	+
SNRIs	+	+	+
Gabapentinoid	-	+	+
CBD	+	-	-
THC	-	+	+

Symptoms of Pain, Fatigue, etc.

- Nociceptive processes (damage or inflammation of tissues)
- Disordered sensory processing



Functional Consequences of Symptoms

- Increased stress
- Decreased activity
- Poor sleep
- Obesity
- Maladaptive illness behaviors

Dually Focused Treatment

- Pharmacological therapies to improve **symptoms**
- Nonpharmacological therapies to address **dysfunction**

Clauw and Crofford. *Best Pract Res Clin Rheumatol*. 2003;17:685-701.

Summary

- When clinically defining TMDs, one of key issues will be whether individuals have pain and symptoms confined to the face, or whether – and to what extent – this is a more centralized, systemic process
  - Phenotype is easily identifiable and includes multifocal pain, fatigue, sleep, memory and sensory sensitivity issues
  - Even though there are many causes for centralized pain (think hypertension) this demarcation can already be helpful clinically in guiding treatment by matching underlying mechanism(s) with treatments targeting those mechanisms
- Lessons from old guy in this field
  - Nothing about any of these conditions is yes or no
  - This is not peripheral vs central – it is peripheral plus central
  - This is not a primary psychological problem
    - Assess psychological factors independently – some people have them (especially as they have pain and symptoms longer), some do not