

Biomedical and Biopsychosocial Aspects of Pain Management

MI-CCSI

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Disclosures

- Consultant to Community Health Focus Inc.
- Consultant to Swing Therapeutics, Inc.
- Funded for research by NIH
- Funded for research by PCORI

Why is Chronic
Pain so difficult to
treat?



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- Multiple underlying causes
- Individual differences
- Neuroplasticity
- Treatment limitations
- Biopsychosocial factors
- A holistic approach is required

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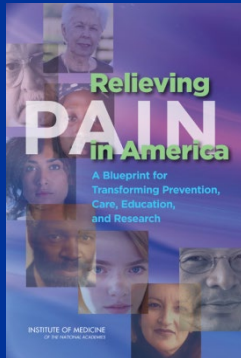
Section 1

- Multiple underlying causes
- Individual differences
- Neuroplasticity

Section 2

- Treatment limitations
- Biopsychosocial factors
- A holistic approach is required

Chronic Pain Numbers

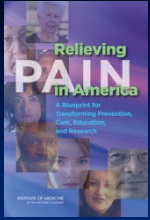


100 Million People
- US



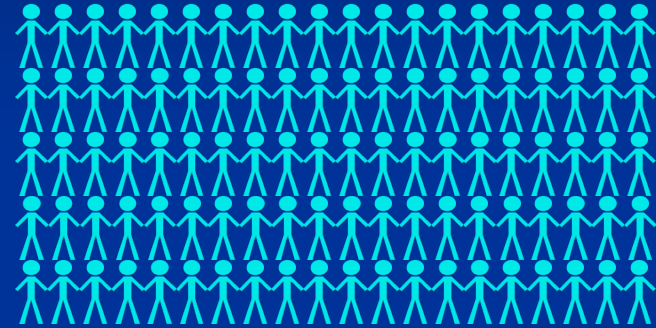
150 Million
- 37 Countries

Eccleston, C., Wells, C. (2017).
European Pain Management.
Oxford University Press



More people have Chronic Pain than Diabetes, Heart Disease, and Cancer Combined

Chronic Pain 100 Million



Diabetes 29.1 Million



Heart Disease 27.6 Million



Cancer 13.7 Million



 = 1 Million individuals

What is Pain?

An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage



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An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage

- Pain is always a personal experience that is influenced to varying degrees by biological, psychological, and social factors.
- Pain and nociception are different phenomena. Pain cannot be inferred solely from activity in sensory neurons.
- Through their life experiences, individuals learn the concept of pain.
- A person's report of an experience as pain should be respected.
- Although pain usually serves an adaptive role, it may have adverse effects on function and social and psychological well-being.
- Verbal description is only one of several behaviors to express pain; inability to communicate does not negate the possibility that a human or a nonhuman animal experiences pain.

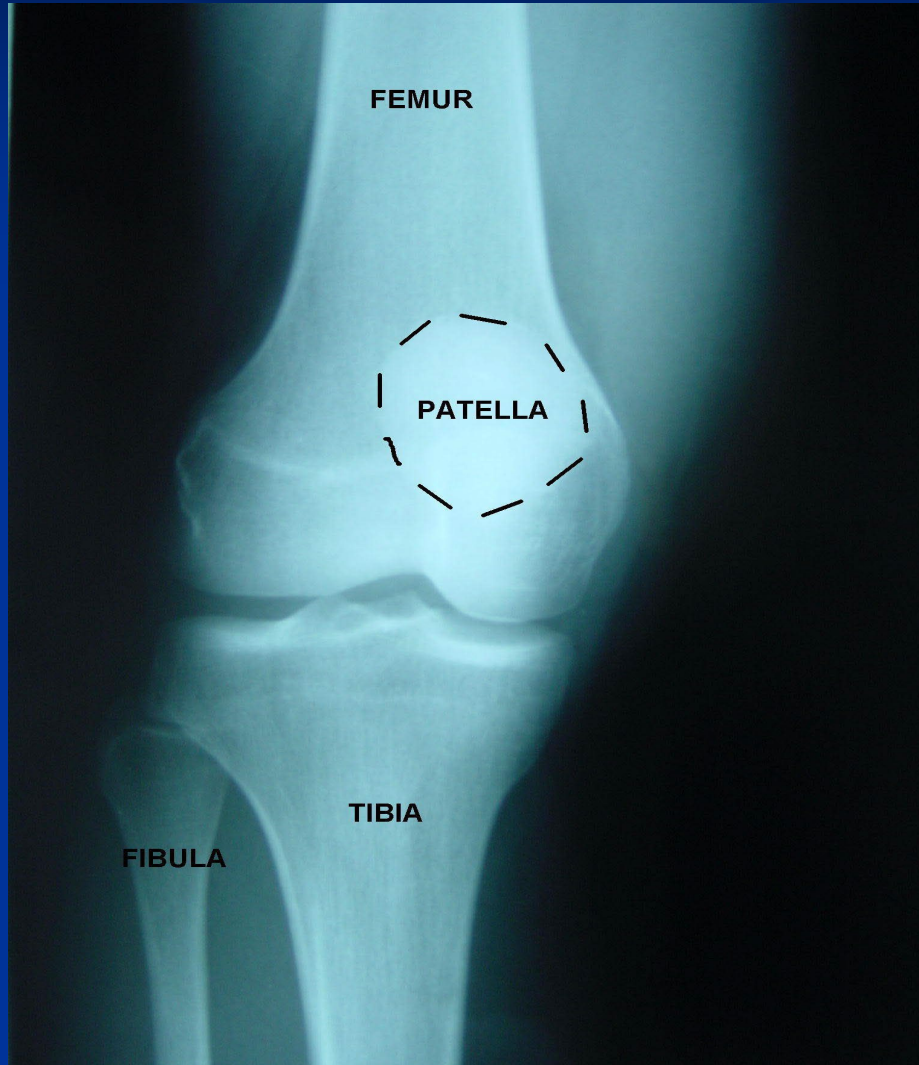


How Does Pain Happen?



Which person has pain?

Normal

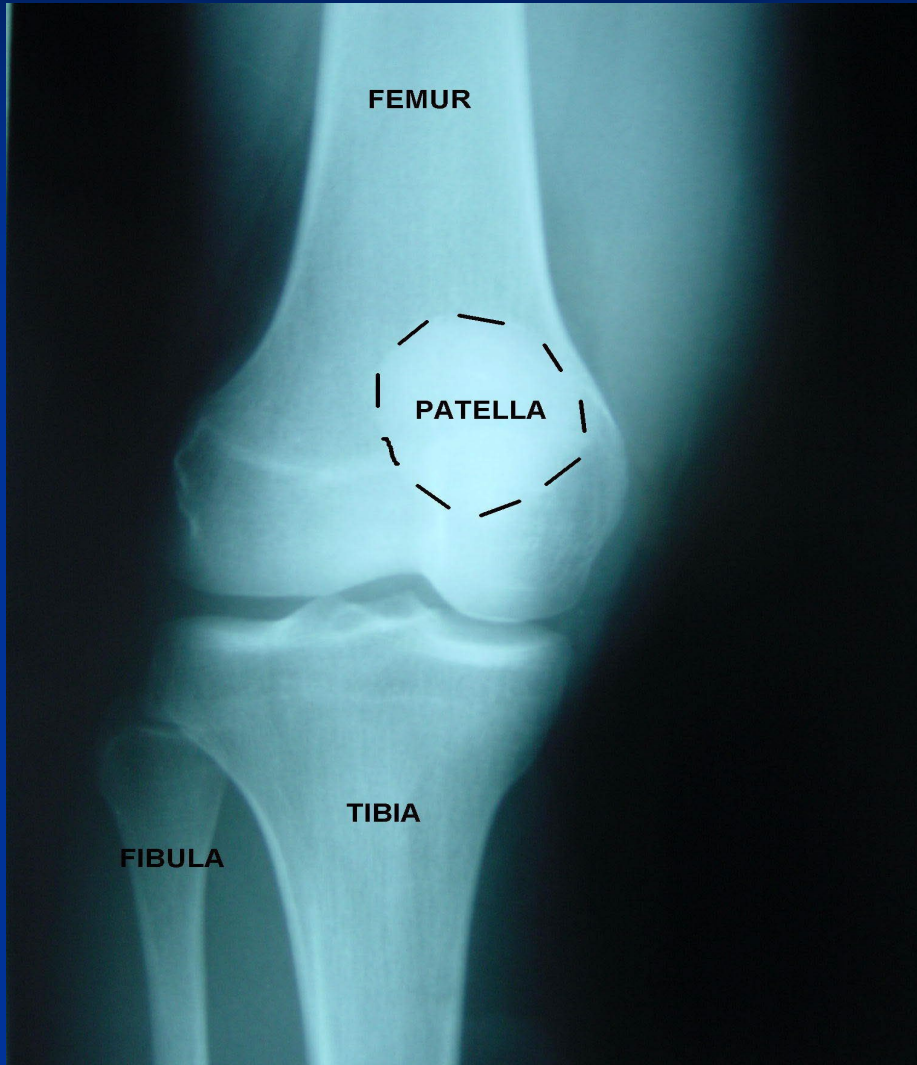


Bone on bone



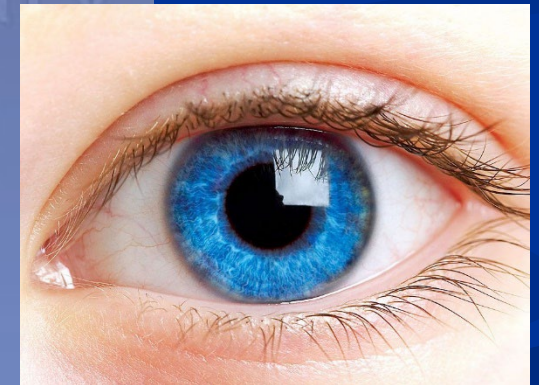
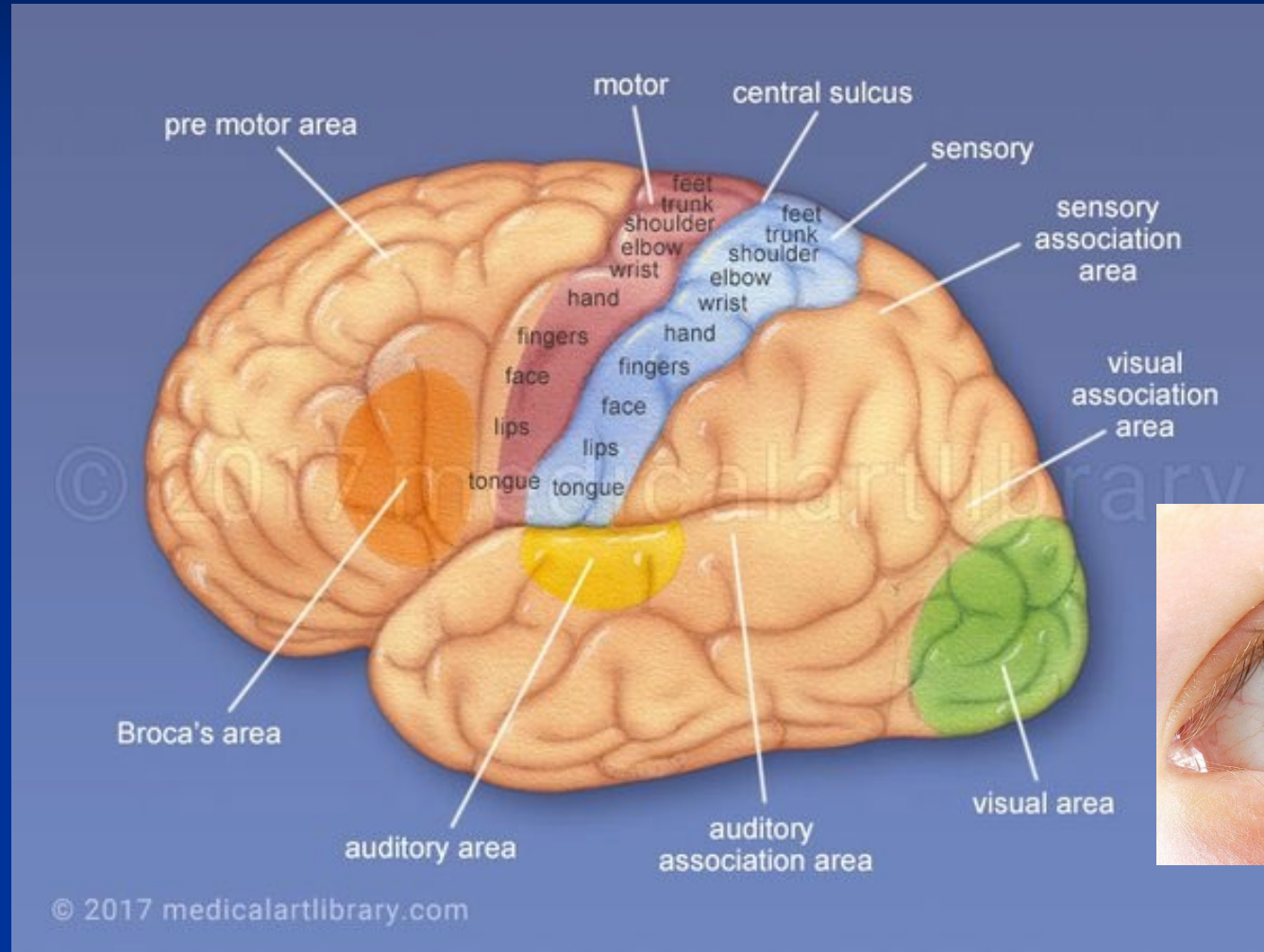
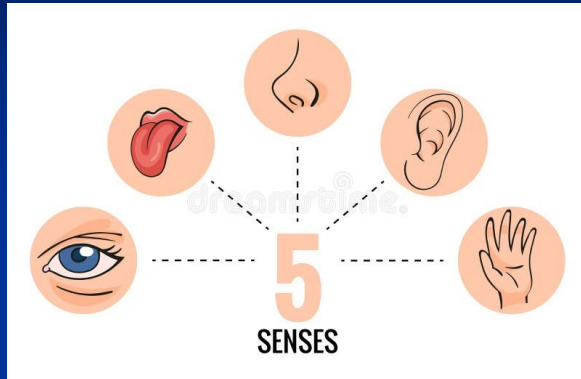
Which person has pain?

“Normal”
10% have pain

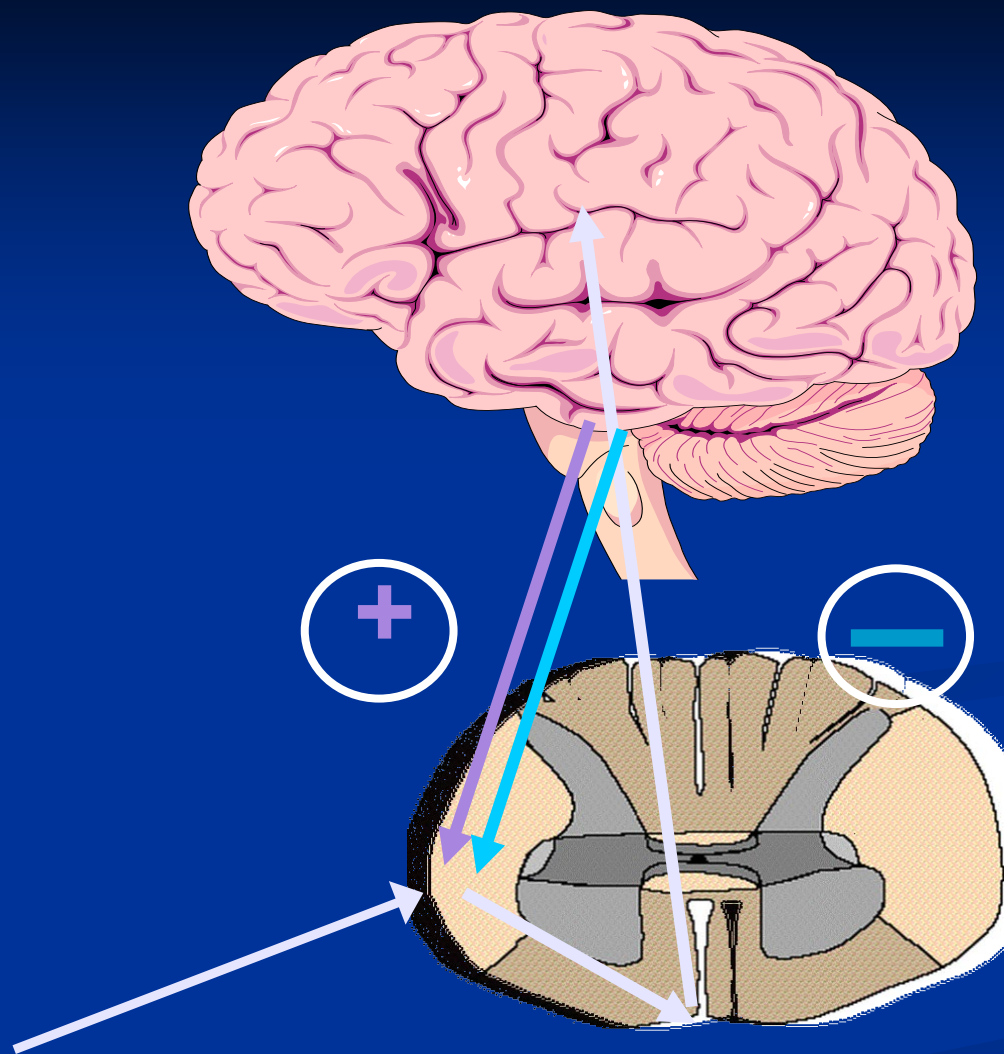
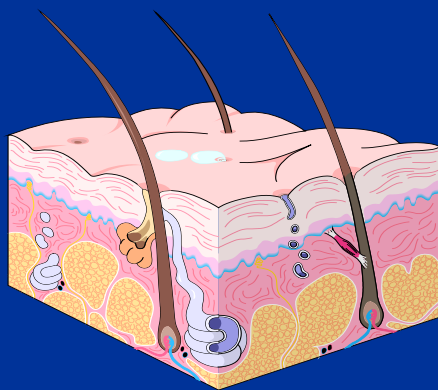


Bone on bone
30-40%
Have no pain

Multi-Stage Sensory Processing



Nociception



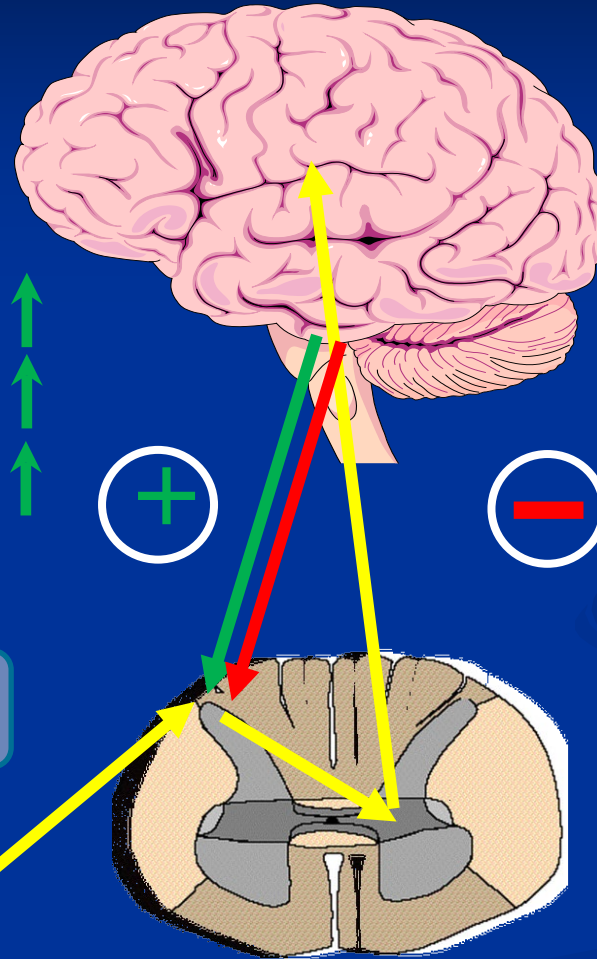
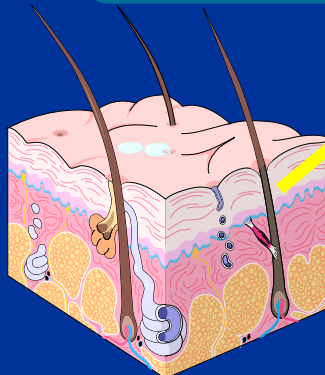
CNS Neurotransmitters Influencing Pain

Facilitation

Glutamate and EAA
Substance P
Nerve growth factor
Serotonin (5HT_{2a, 3a})

Gabapentinoids,
ketamine

Anti-migraine drugs (–
triptans),
cyclobenzaprine



Inhibition

Descending anti-nociceptive pathways

↓ Norepinephrine-serotonin (5HT_{1a,b}),
dopamine

Tricyclics, SNRIs,
tramadol

↑ Opioids

Low dose naltrexone

Cannabinoids

↓ GABA

Gammahydroxybutyrate,
moderate alcohol
consumption

No knowledge of
endocannabinoid
activity but this class
of drugs is effective

1. Schmidt-Wilcke T, Clauw DJ. *Nat Rev Rheumatol*. Jul 19 2011.
2. Clauw DJ. *JAMA*. 2014.

Neurobiological perspective

Brain regions associated with pain processing involve both sensory and affective/cognitive regions

- **Sensory / discriminative dimension**
 - Somatosensory cortices (S1, S2)
 - Dorsal posterior insula
- **Affective / Cognitive dimensions**
 - Anterior insula
 - Prefrontal cortex
 - Anterior cingulate cortex
 - Thalamus
 - Amygdala
 - Hippocampus



Neurobiological perspective

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Neurobiological perspective

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■ Sensory / discriminative dimension

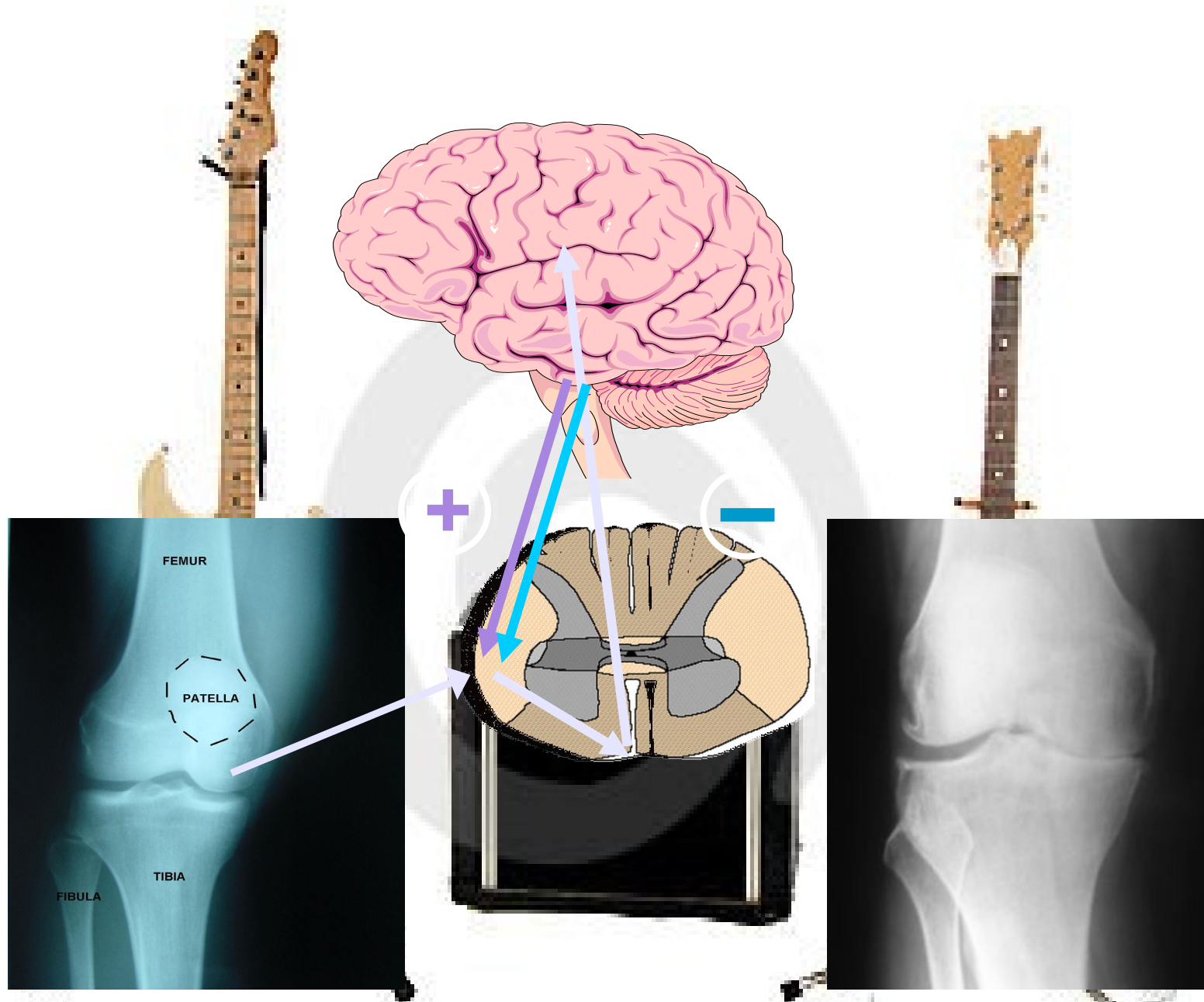
- Somatosensory cortices (S1, S2)
- Dorsal posterior insula

■ Affective / Cognitive dimensions

- Anterior insula
- Prefrontal cortex
- Anterior cingulate cortex
- Thalamus
- Amygdala
- Hippocampus

I still feel
pain





Neurotransmitters for Pain Processing

Norepinephrine

Concentration

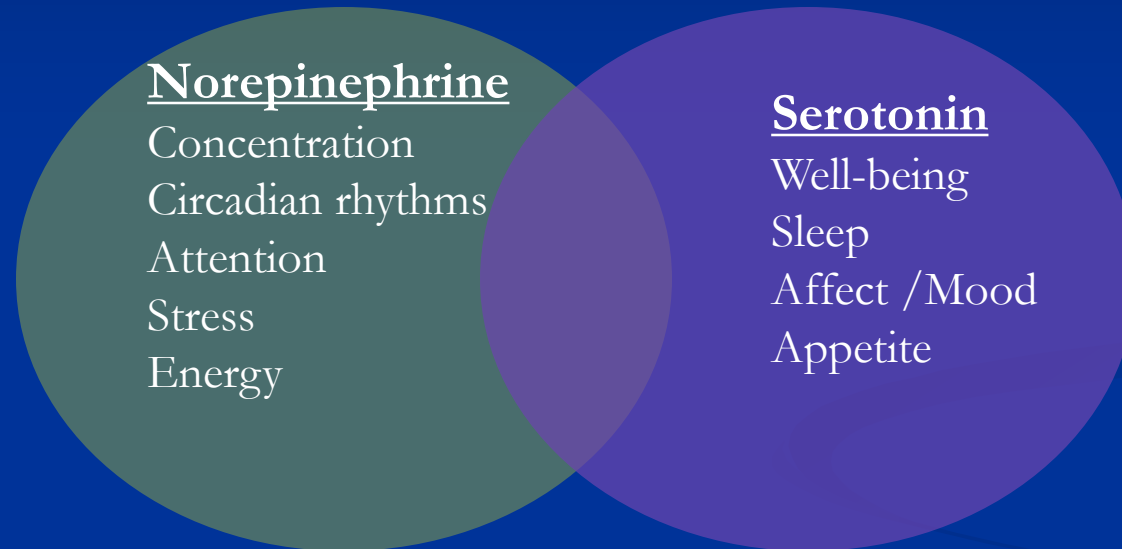
Circadian rhythms

Attention

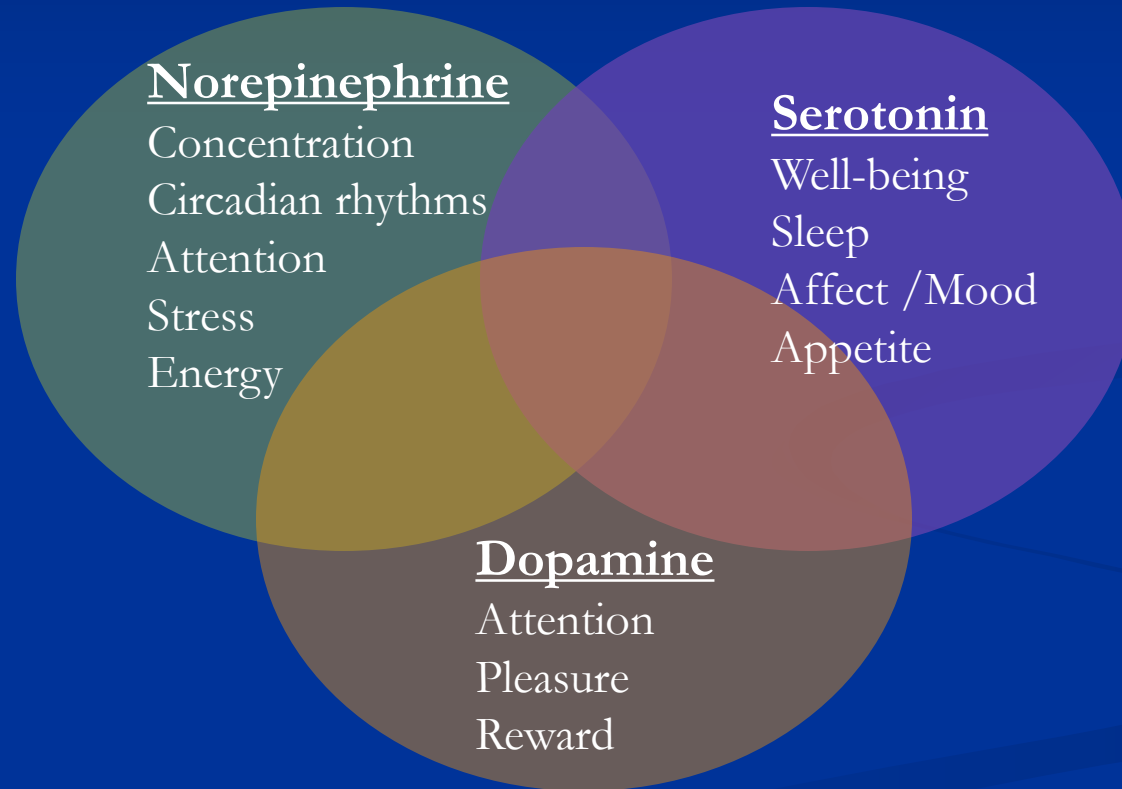
Stress

Energy

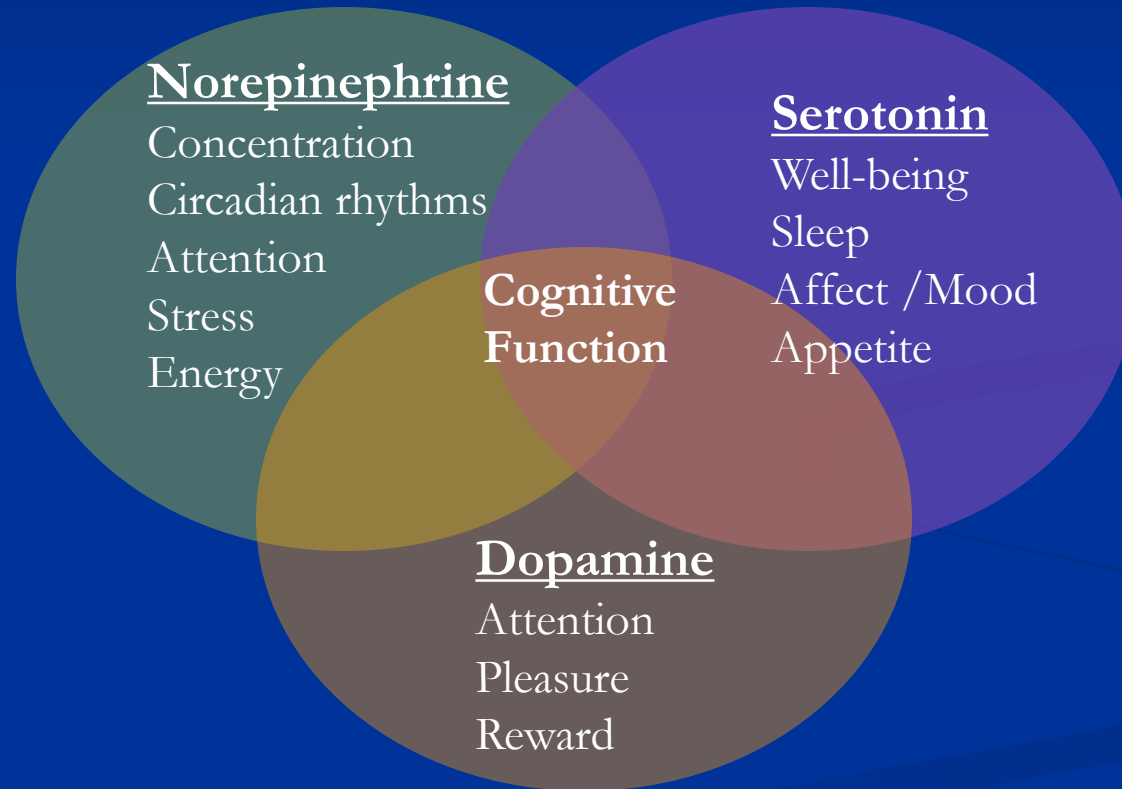
Neurotransmitters for Pain Processing



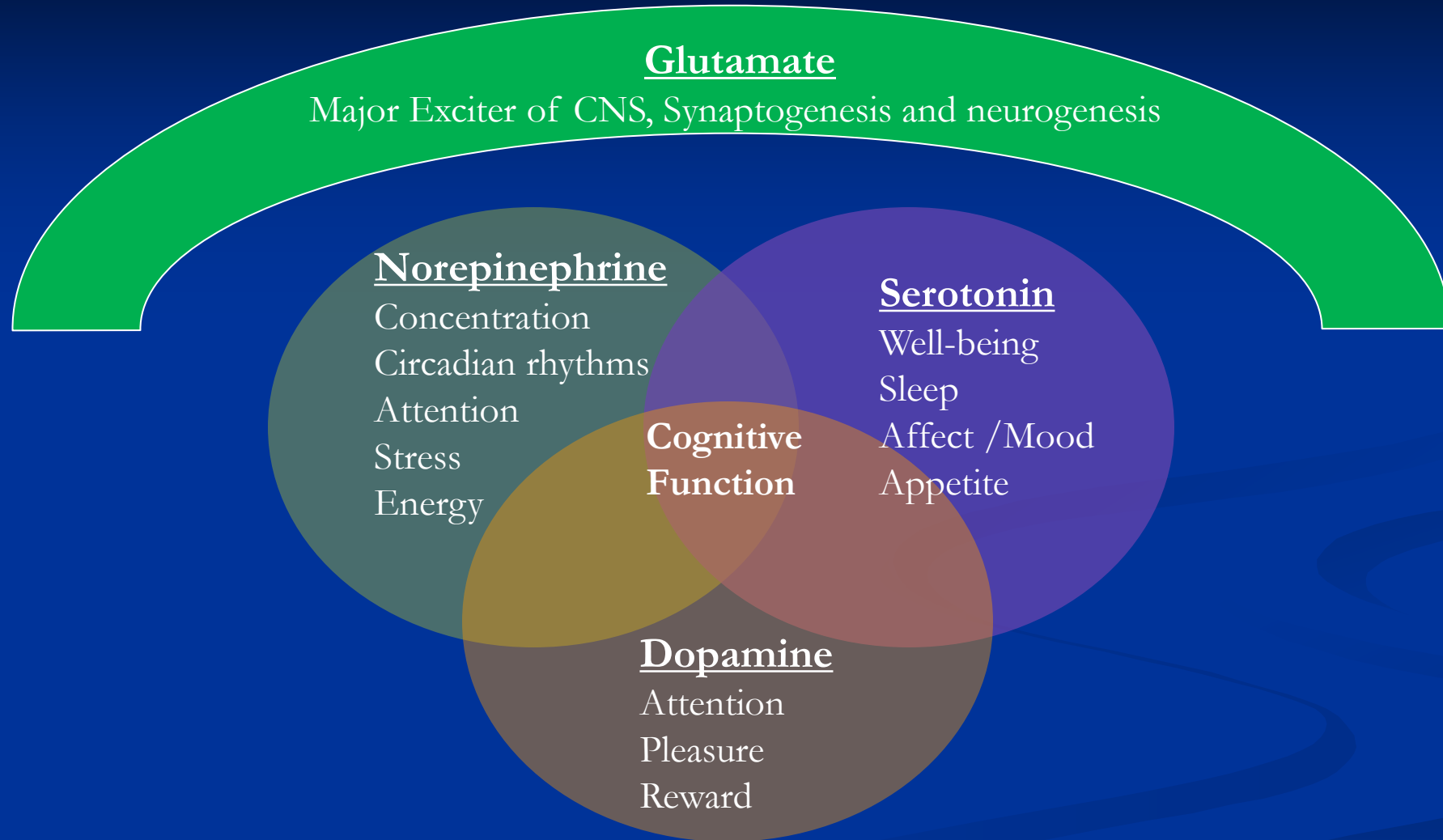
Neurotransmitters for Pain Processing



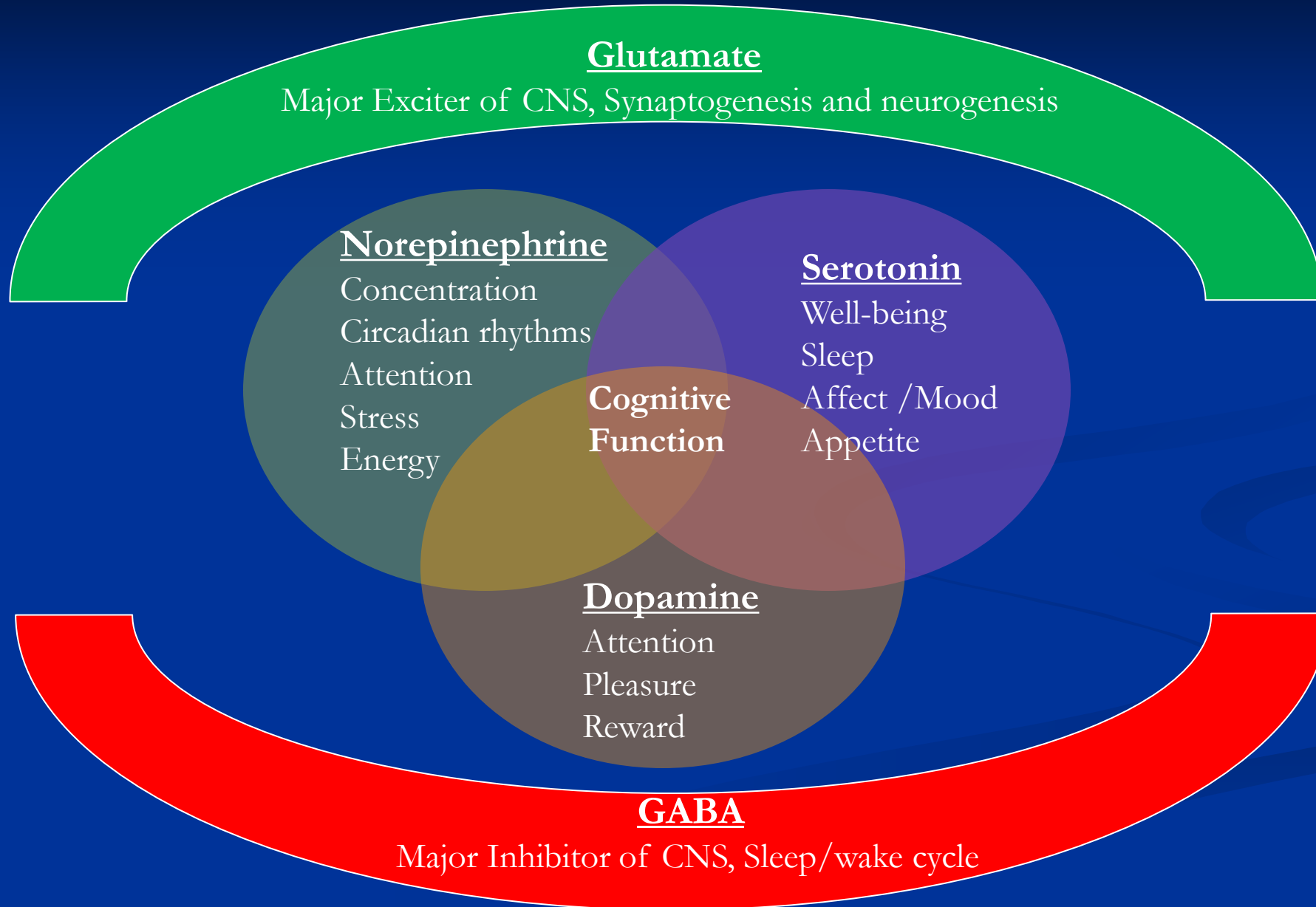
Neurotransmitters for Pain Processing



Neurotransmitters for Pain Processing



Neurotransmitters for Pain Processing



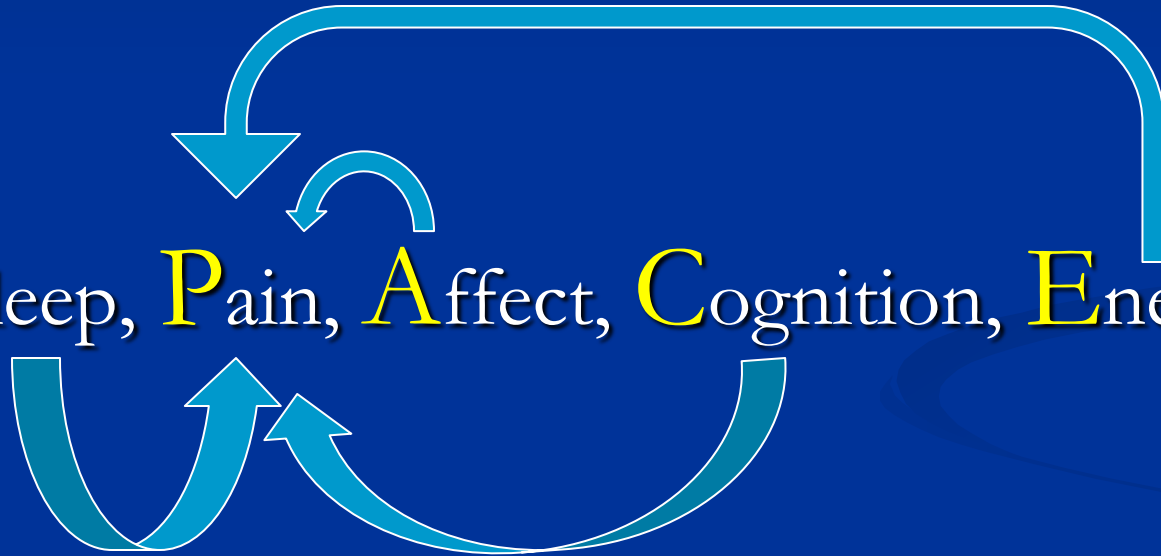
Shared Neurotransmitters Explain

- The complexity of chronic pain presentation

Shared Neurotransmitters Explain

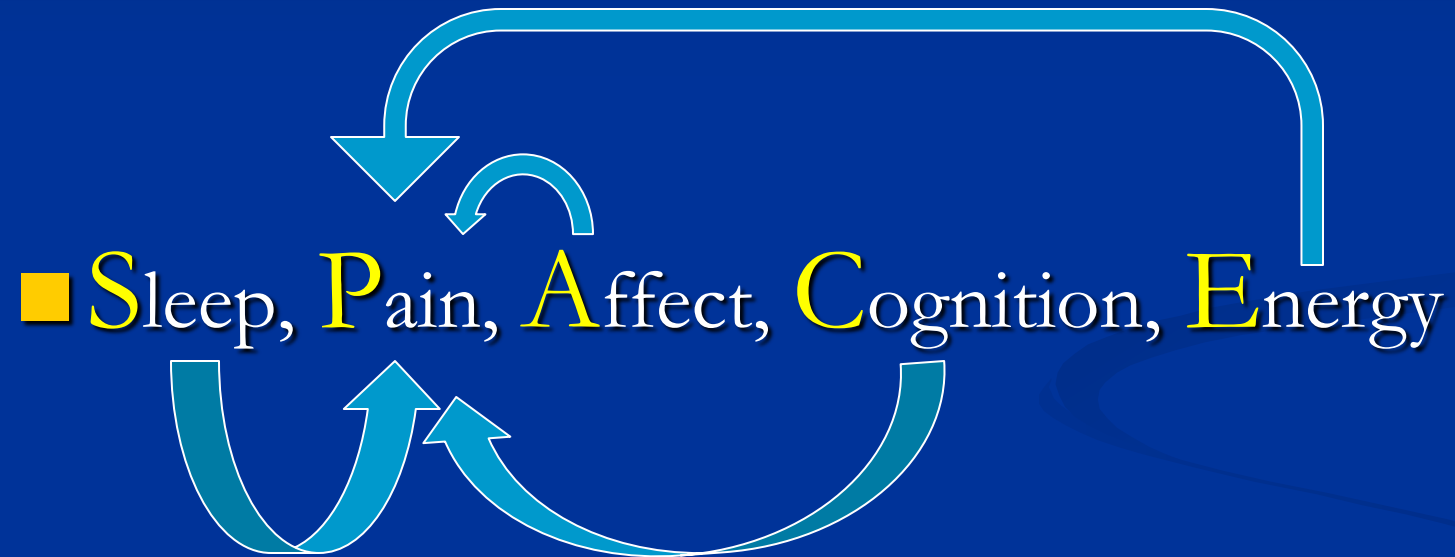
- The complexity of chronic pain presentation

■ Sleep, Pain, Affect, Cognition, Energy



Shared Neurotransmitters Explain

- The complexity of chronic pain presentation



- Sleep, Pain, Affect, Cognition, Energy

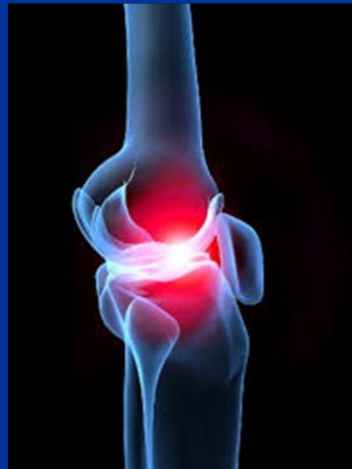
- **SPACE** represents new targets for treating pain perception

How is Pain Classified?

Time	Body Location	Suspected Etiology
Acute Vs Chronic	Head, Neck, Back, Pelvis	Cancer, Rheumatic, etc.

Newest Classification: Pain Mechanisms

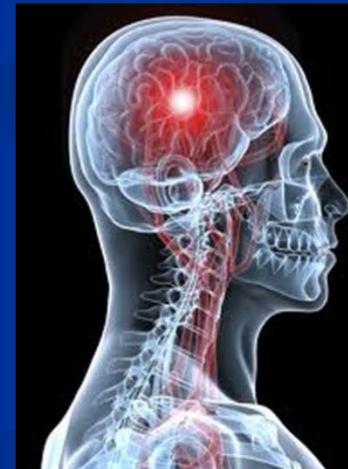
Nociceptive
Peripheral damage
or inflammation



Neuropathic



Nociplastic



¹Woolf CJ. *J Clin Invest.* 2010;120(11):3742-3744. ²Costigan M, et al. *Annu Rev Neurosci.* 2009;32:1-32. ³Dickinson BD, et al. *Pain Med.* 2010;11:1635-1653. ⁴Williams DA, Clauw DJ. *J Pain.* 2009;10(8):777-791.

Nociceptive Pain

Mechanical, Thermal, Chemical
Inflammation or Damage



Pain is well localized
Consistent with injury/damage



Classic Examples:
OA, autoimmune disorders, Cancer pain, Injury

Responsive to:
NSAIDs, injections, surgery, opioids

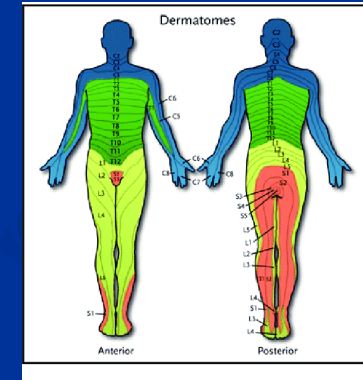


Neuropathic Pain (Peripheral or Central)

Nerve Damage or Entrapment



Peripheral nerve distribution (e.g., dermatomes)
Experienced as episodic numbness/tingling



Responsive to:

Local treatments of nerves

Surgery, injections, CNS-acting drugs

Classic Examples:

Painful diabetic neuropathy, Sciatica,
Carpal Tunnel, Post-Stroke pain



Nociplastic Pain

CNS augmentation of peripheral nociception or CNS generation

Pain is widespread

- Disproportionate to injury
- Accompanied by CNS-mediated symptoms

Responds to:

CNS acting drugs and Non-pharm treatments

Classic Examples:

- Fibromyalgia
- Chronic overlapping pain conditions (COPCS)



How Do you Assess Pain?

- Intensity
- Multi-focal (widespread)

Intensity

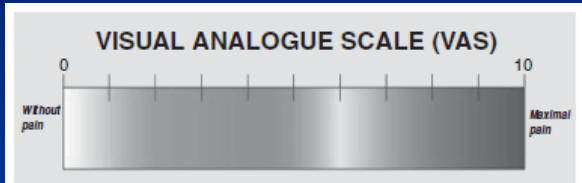
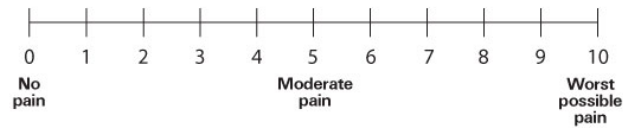


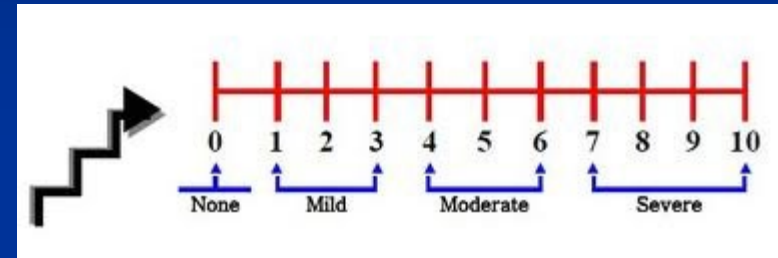
Figure 1. Visual Analogue Scale used to measure Pain.

0-10 Numeric Pain Intensity Scale *



Verbal Rating Scale: Discomfort Rating

- 0- Pain or Discomfort - none
- 1- Pain or Discomfort - I am aware of it, I think about it
- 2- Pain or Discomfort - I am aware of it, I think about it but I can ignore it at times.
- 3- Pain or Discomfort - I can't ignore it, but I can do my usual activities.
- 4- Pain or Discomfort - It is difficult for me to concentrate; I can only do easy activities.
- 5- Pain or Discomfort - Such that I cant do anything.



Wong-Baker FACES™ Pain Rating Scale





Chronic Pain 2

Nociplastic pain: towards an understanding of prevalent pain conditions

Mary-Ann Fitzcharles*, Steven P Cohen*, Daniel J Clauw, Geoffrey Littlejohn, Chie Usui, Winfried Häuser

Lancet 2021; 397: 2098–110

See [Comment](#) page 2029

This is the second in a [Series](#) of three papers about chronic pain

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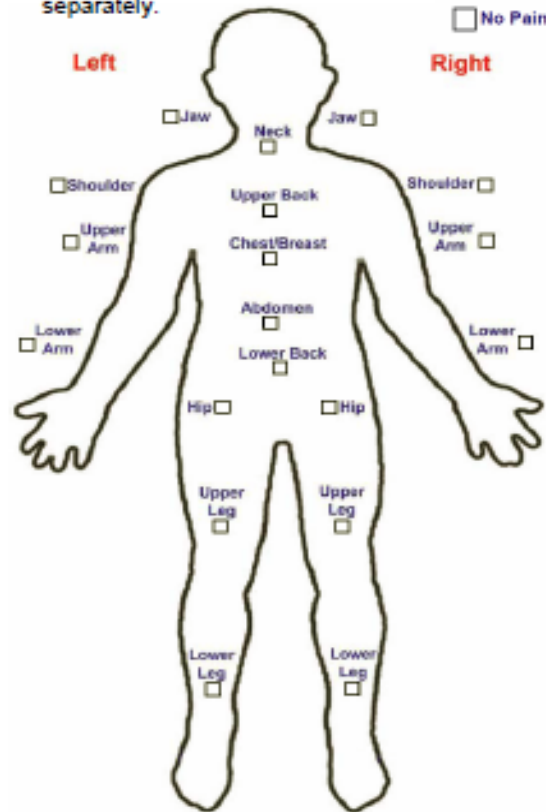
(M-A Fitzcharles MBChB);
Department of Psychiatry and
Behavioral Sciences and
Department of Anesthesiology

Nociplastic pain is the semantic term suggested by the international community of pain researchers to describe a third category of pain that is mechanistically distinct from nociceptive pain, which is caused by ongoing inflammation and damage of tissues, and neuropathic pain, which is caused by nerve damage. The mechanisms that underlie this type of pain are not entirely understood, but it is thought that augmented CNS pain and sensory processing and altered pain modulation play prominent roles. The symptoms observed in nociplastic pain include multifocal pain that is more widespread or intense, or both, than would be expected given the amount of identifiable tissue or nerve damage, as well as other CNS-derived symptoms, such as fatigue, sleep, memory, and mood problems. This type of pain can occur in isolation, as often occurs in conditions such as fibromyalgia or tension-type headache, or as part of a mixed-pain state in combination with ongoing nociceptive or neuropathic pain, as might occur in chronic low back pain. It is important to recognise this type of pain, since it will respond to different therapies than nociceptive pain, with a decreased responsiveness to peripherally directed therapies such as anti-inflammatory drugs and opioids, surgery, or injections.

2010/11/16 ACR criteria for FM

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 ☐

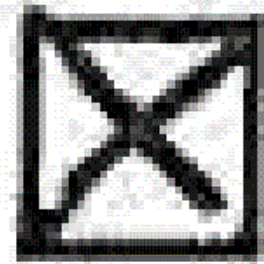
Knee



Lower



Knee



Lower

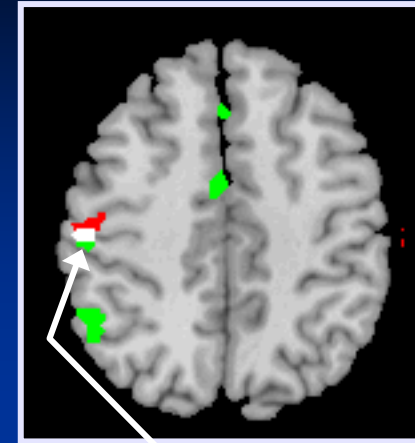
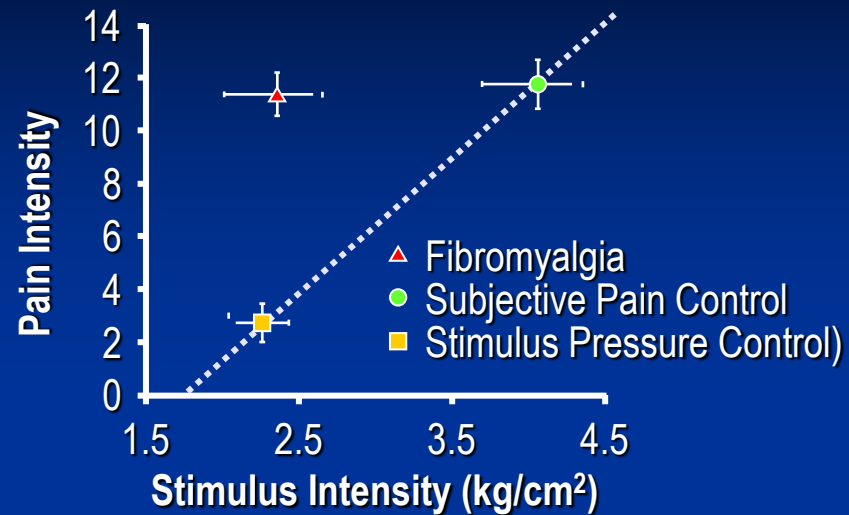


What Do We Know About the Central Amplifier?

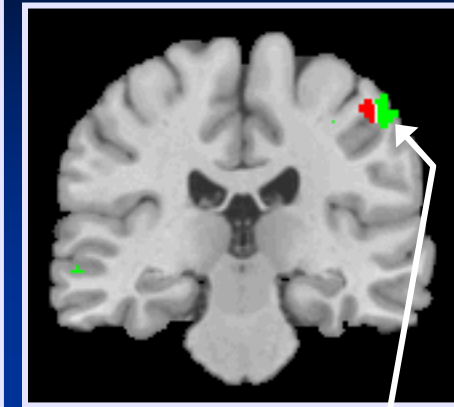
Pathophysiology of centralized pain states– understading the “central amplifier”

- Most patients display augmented pain and sensory processing on quantitative sensory testing and functional neuroimaging^{1,3}
- Manifest by increased connectivity to pro-nociceptive brain regions and decreased connectivity to anti-nociceptive regions^{2,3}
- These abnormalities are being driven by imbalances in concentrations of CNS neurotransmitters that control sensory processing, sleep, alertness, affect, memory^{3,4}
- Autonomic, HPA, and peripheral abnormalities likely play a prominent role in some individuals

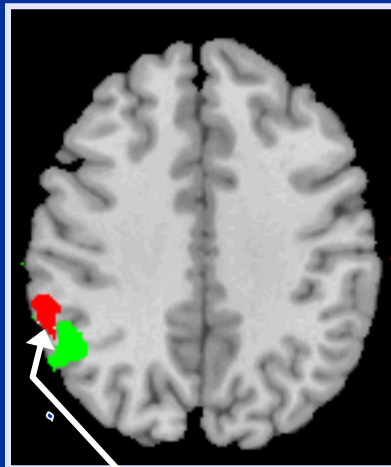
fMRI in Fibromyalgia



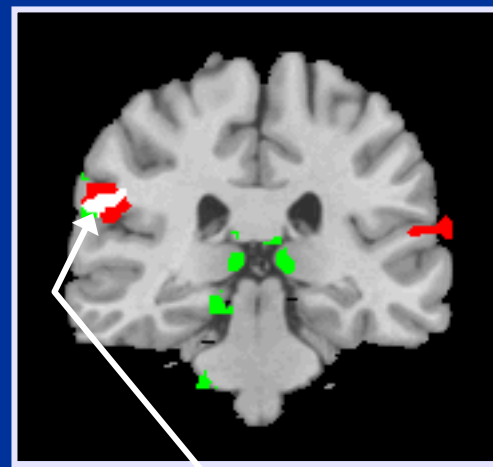
SI



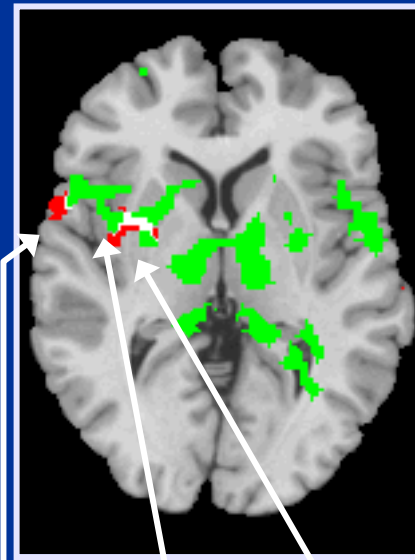
SI (decrease)



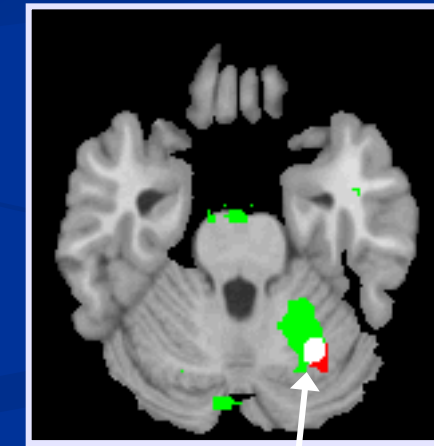
IPL



SII



STG, Insula, Putamen

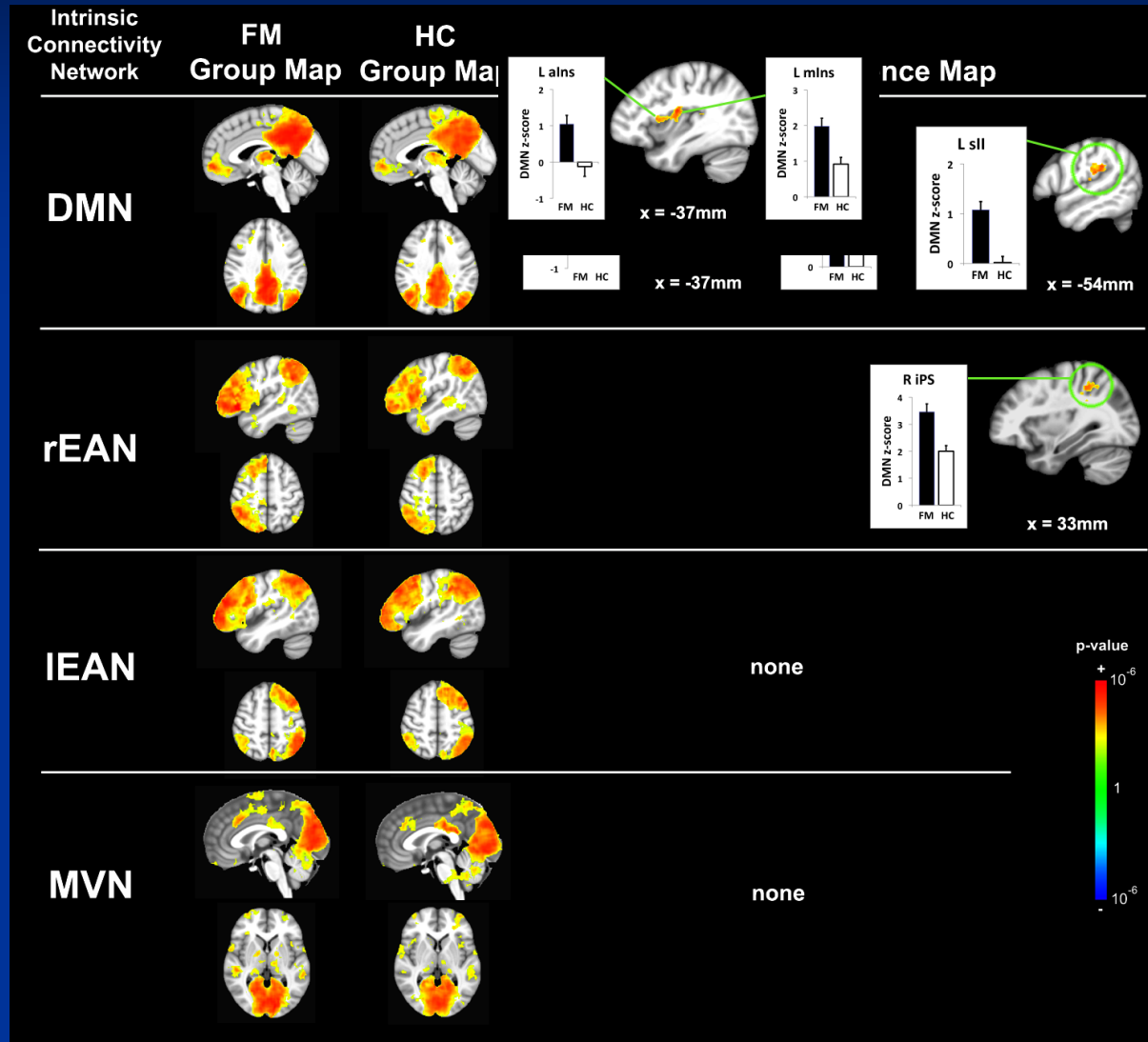


Cerebellum

STG=superior temporal gyri; SI=primary somatosensory cortex
SII=secondary somatosensory cortex; IPL=inferior parietal lobule.

Gracely. *Arthritis Rheum.* 2002;46:1333-1343.

Intrinsic Brain Connectivity is Altered in FM patients



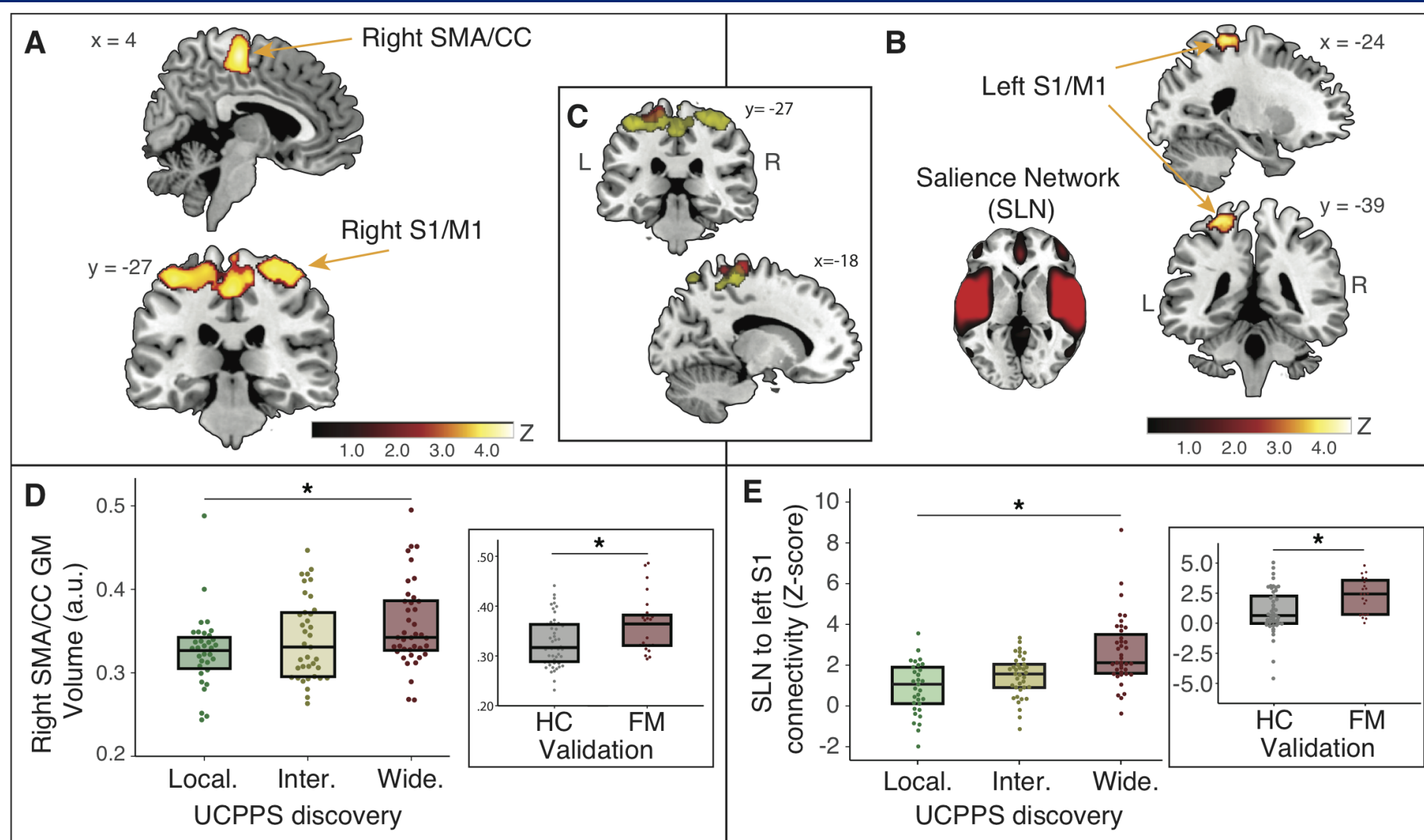
- In FM, DMN and rEAN show greater intrinsic connectivity within component DMN (PCC), and rEAN (iPS) as well as limbic (insula), and sensorimotor (SII) regions outside conventional network boundaries.

- All FM vs. HC differences driven by greater connectivity for FM patients

Changes in size and shape of brain regions indicate CNS neuroplasticity in chronic pain

- Apkarian¹ was first to show that chronic pain may be associated with decrease of size of brain areas involved in pain processing
- More recently seen in virtually all other chronic pain states including headache,² IBS,³ FM⁴
- May be partially due to co-morbid mood disturbances⁶
- Data from NIH MAPP network suggests *increase* in size of and connectivity to S1 may represent neural signature for widespreadness of pain

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



Original Article

Heritability of the Fibromyalgia Phenotype Varies by Age

Diptavo Dutta, Chad M. Brummett, Stephanie E. Moser, Lars G. Fritsche, Alexander Tsodikov, Seunggeun Lee, Daniel J. Clauw, Laura J. Scott ✉, ... See fewer authors ^

First published: 17 November 2019 | <https://doi.org/10.1002/art.41171> | Citations: 3

Results

Overall, the FM score had an estimated heritability of 13.9% (SE 2.9%) ($P = 1.6 \times 10^{-7}$). Estimated FM score heritability was highest in individuals ≤ 50 years of age (23.5%; SE 7.9%) ($P = 3.0 \times 10^{-4}$) and lowest in individuals > 60 years of age (7.5%; SE 8.1%) ($P = 0.41$). These patterns remained the same when we analyzed FM as a case-control phenotype. Even though women had an ~30% higher average FM score than men across age categories, FM score heritability did not differ significantly by sex.

Conclusion

Younger individuals appear to have a much stronger genetic component to the FM score than older individuals. Older individuals may be more likely to have what was previously called "secondary FM." Regardless of the cause, these results have implications for future genetic studies of FM and associated conditions.

Neurobiological antecedents of multisite pain in children

Chelsea M. Kaplan^{a,*}, Andrew Schrepf^a, Ishtiaq Mawla^b, Eric Ichesco^a, Kevin F. Boehnke^a, Adriene Beltz^c, Emily Foxen-Craft^d, Michael P. Puglia II^a, Alexandre Tsodikov^e, David A. Williams^{a,b,f,g}, Afton L. Hassett^a, Daniel J. Clauw^{a,f,g}, Steven E. Harte^{a,b,g}, Richard E. Harris^{a,b,g}

Abstract

Altered brain structure and function is evident in adults with multisite chronic pain. Although many such adults trace their pain back to childhood, it has been difficult to disentangle whether central nervous system alterations precede or are consequences of chronic pain. If the former is true, aberrant brain activity may identify children vulnerable to developing chronic pain later in life. We examined structural and functional brain magnetic resonance imaging metrics in a subset of children from the first 2 assessments of the Adolescent Brain and Cognitive Development Study. Children (aged 9-10) who were pain free at baseline and then developed multisite pain 1 year later ($n = 115$) were matched to control children who were pain free at both timepoints ($n = 230$). We analyzed brain structure (cortical thickness and gray matter volume) and function (spontaneous neural activity and functional connectivity).

Results were deemed significant at the cluster level $P < 0.05$ false discovery rate corrected for multiple comparisons. At baseline, children who subsequently developed multisite pain had increased neural activity in superior parietal /primary somatosensory and motor cortices and decreased activity in the medial prefrontal cortex. They also exhibited stronger functional connectivity between the salience network, somatosensory, and default mode network regions. No significant differences in the brain structure were observed. Increased neural activity and functional connectivity between brain regions, consistent to that seen in adults with chronic pain, exist in children before developing multisite pain. These findings may represent a neural vulnerability to developing future chronic pain.

Keywords: Multisite pain, Children, fMRI, Functional connectivity, Risk factors

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.

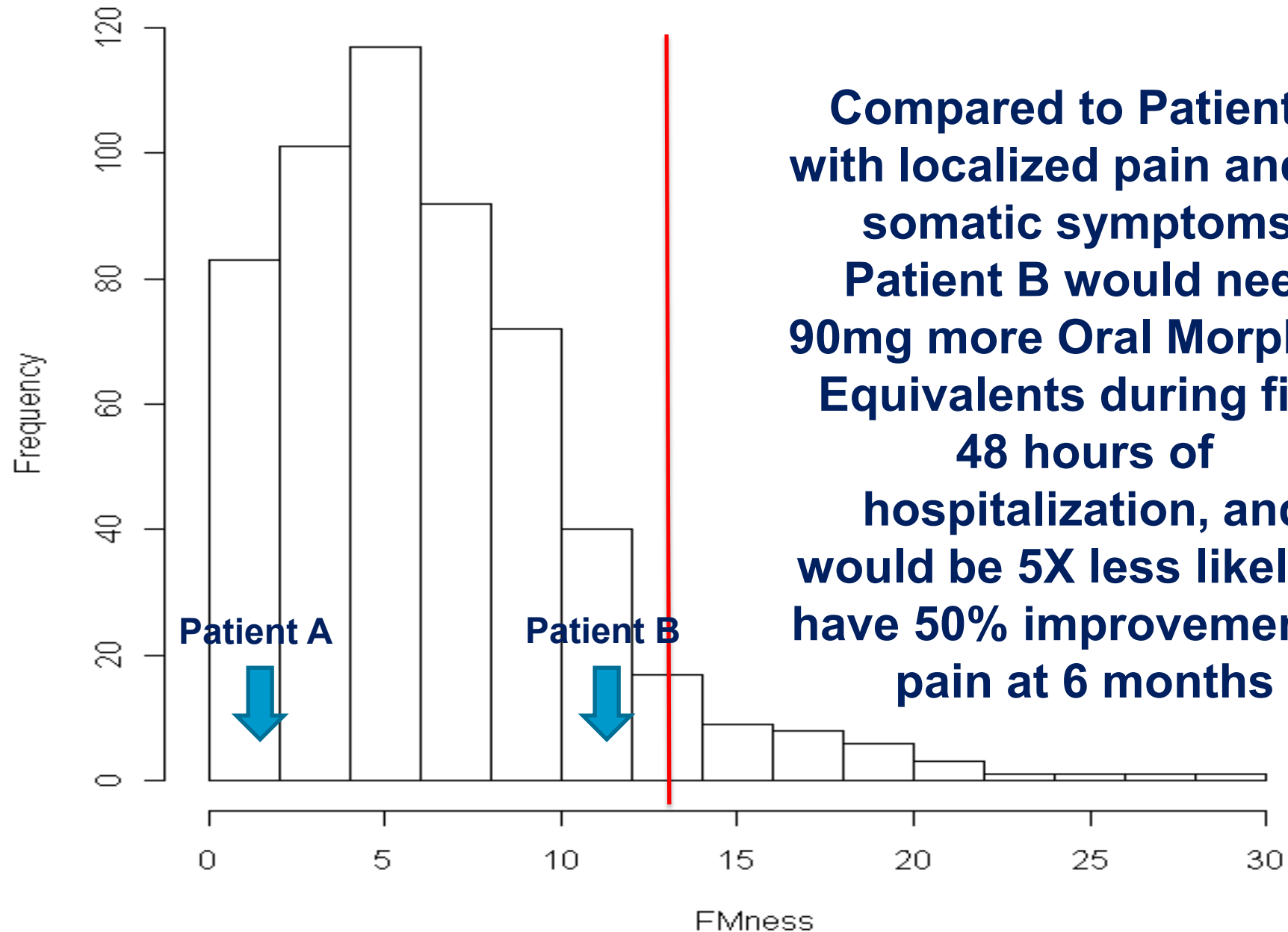
2. Brummett, C.M., et al., Arthritis Rheumatol, 2015. 67(5):1386-94.

3. Janda, A.M., et al., Anesthesiology, 2015. 122(5): p. 1103-11.

Each one point increase in fibromyalgiansess 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 psychiatric factors

Distribution of FMness



**Compared to Patient A
with localized pain and no
somatic symptoms,
Patient B would need
90mg more Oral Morphine
Equivalents during first
48 hours of
hospitalization, and
would be 5X less likely to
have 50% improvement in
pain at 6 months**

Incidence and predictors of persistent pelvic pain following hysterectomy in women with chronic pelvic pain

Sawsan As-Sanie, MD, MPH; Sara R. Till, MD, MPH; Andrew D. Schrepf, PhD; Kendall C. Griffith, MD; Alex Tsodikov, PhD; Stacey A. Missmer, ScD; Daniel J. Clauw, MD; Chad M. Brummett, MD

BACKGROUND: Chronic pelvic pain is a debilitating problem that afflicts 15% to 20% of women in the United States. Although more than 200,000 hysterectomies are performed annually for the treatment of chronic pelvic pain, previous studies indicate that 1 in 4 women undergo the discomfort and morbidity of hysterectomy without the relief of pain. The factors that predict treatment failure remain poorly characterized.

OBJECTIVE: To describe the incidence of persistent pelvic pain 6 months following hysterectomy in women with chronic pelvic pain and determine whether a simple, self-reported measure of central sensitization is associated with a greater risk of persistent pelvic pain following hysterectomy.

STUDY DESIGN: We conducted a prospective, observational cohort study of women undergoing hysterectomy at an academic tertiary care center for a benign indication. Patients with preoperative chronic pelvic pain, defined as average pelvic pain ≥ 3 on a 0 to 10 numeric rating scale for >3 months before hysterectomy, were included in this analysis. The patients completed validated assessments of pain, anxiety, depression, and centralized pain (using the 2011 Fibromyalgia Survey Criteria, 0–31 points) preoperatively and 6 months after hysterectomy. The demographic information, surgical history, intraoperative findings, and surgical pathology were abstracted from the

RESULTS: Among 176 participants with pelvic pain before hysterectomy, 126 (71.6%) were retained at 6 months, and 15 (11.9%) reported persistent pelvic pain. There was no difference in age ($P=.46$), race ($P=.55$), average pain severity during menses ($P=.68$), average overall pelvic pain ($P=.10$), or pain duration ($P=.80$) in those with and without persistent pelvic pain. Whereas intraoperative findings of endometriosis ($P=.05$) and uterine fibroids ($P=.03$) were associated with a higher incidence of persistent pain on univariate analysis, the surgical route ($P=.46$), pelvic adhesions (0.51), uterine weight ($P=.66$), and adenomyosis on histopathology ($P=.27$) were not related to the risk of persistent pain. Higher preoperative centralized pain scores ($P=.01$) but not depression ($P=.64$) or anxiety ($P=.45$) were more common in women with persistent pelvic pain. Multivariate logistic regression adjusting for age, preoperative pain severity, anxiety, depression, and operative findings of endometriosis and fibroids indicated that every 1-point increase in centralized pain before hysterectomy was associated with a 27% increase in the odds of persistent pelvic pain (odds ratio, 1.27; 95% confidence interval, 1.03–1.57) 6 months after surgery.

CONCLUSION: Although the majority of women with chronic pelvic pain report considerable improvement in pain following hysterectomy, higher degrees of centralized pain before hysterectomy is a robust pre-

Chronic Overlapping Pain Conditions



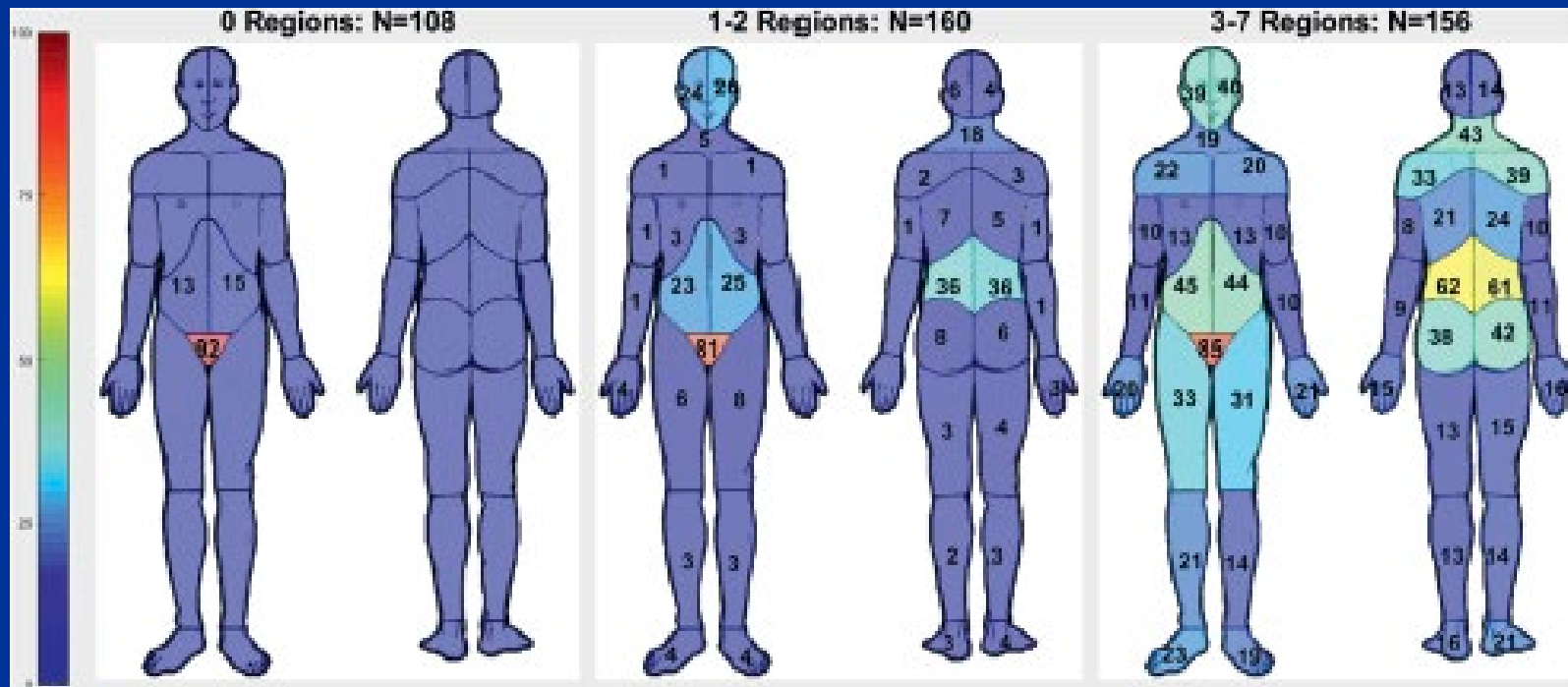
- Term defined by the National Institutes of Health ~ 2013
- Conditions likely to co-exist sharing neurobiological underpinnings
- Conditions predominantly (or solely) affecting women
- Any number and combination of conditions is possible
- Several conditions can develop at once or gradually over years

¹Veasley, C. et al (2015). White paper from the *Chronic Pain Research Alliance*.

COPCs ¹	US Prevalence
Irritable Bowel Syndrome	44 Million
Temporomandibular Disorder	35 Million
Chronic Low Back Pain	20 Million
Interstitial Cystitis / BPS; chronic prostatitis	8 Million
Migraine Headache	7 Million
Tension Headache	7 Million
Endometriosis (Painful)	6 Million
Vulvodynia	6 Million
Fibromyalgia	6 Million
Myalgic Encephalopathy / CFS	4 Million

Can you have just 1 COPC and still have it be a COPC?

Pain Distribution in IC (MAPP)



Interstitial Cystitis

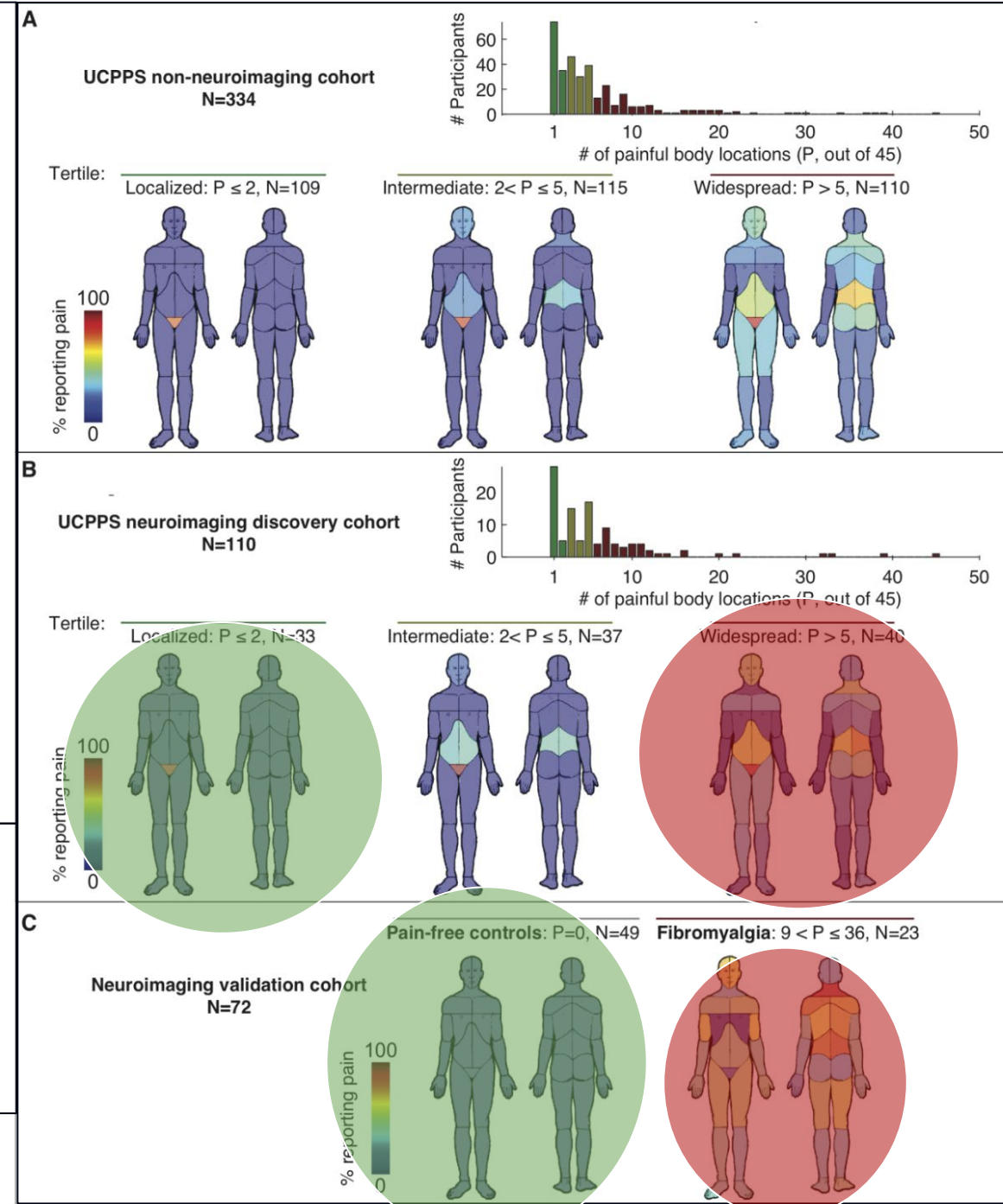
Tertiles of body pain distribution:

local, intermediate, widespread

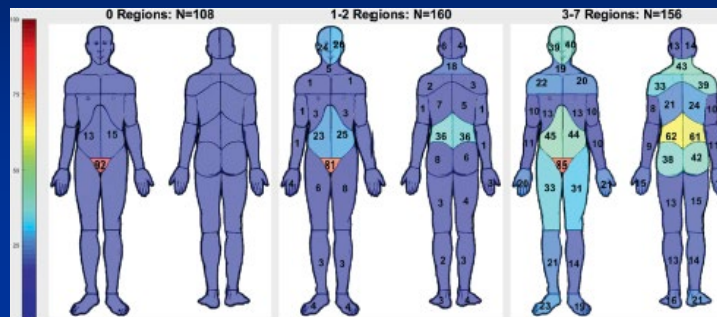
Non-Neuroimaging
(N=334)

Neuroimaging
(N=110)

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



Similar Pattern in other COPCs



Condition	Index only	1-2 regions + index	≥ 3 + index
IC (n=424)	25%	38%	37%
C. Migraine (n=1601)	29%	26%	45%
Mixed COPCs (n=9169)	25%	75%	

Lai, HH, Jemielita, T, Sutcliffe, S., Bradley CS, Naliboff, B, Williams, DA et al. J. Urology. (2017), 198(3): 622-631.

Barad, MJ et al. Headache. (2021), 61(6): 872-881.

Quinlan, T A et al. Health Services Research. (2021), 56:1233-1244.

Two methods for assessing COPCS for clinical research

- ICD-10 Computable Phenotype
- The Chronic Overlapping Pain Conditions Screener (COPCS)

Original Reports

ICD-10 Codes for the Study of Chronic Overlapping Pain Conditions in Administrative Databases



Andrew Schrepf,^{*} Vy Phan,[†] J. Quentin Clemens,[‡] William Maixner,[§] David Hanauer,[¶] and David A. Williams^{*}

^{*}Chronic Pain and Fatigue Research Center, Department of Anesthesiology, University of Michigan Medical School, Ann Arbor, Michigan, [†]Trinity College-Hartford, Hartford, Connecticut, [‡]Department of Urology, University of Michigan Medical School, Ann Arbor, Michigan, [§]Center for Translational Pain Medicine, Department of Anesthesiology, Duke University School of Medicine, Durham, North Carolina, [¶]Department of Pediatrics, University of Michigan Medical School, Ann Arbor, Michigan

FM	IBS	IC/BPS, CP	VVD	MI
• M79.7	• K58.[0,1,2,8,9]	• N30.[1,3] • N41.1	• N94.8[10,18,19]	• G43.xx
TTH	TMD	cLBP	ME/CFS	ENDO+pain
• G44.[201,209,211,219,221,229]	• M26.[60,62,63] • S03.0xxA	• M54.[5,40,41,42,89]	• R53.82	• N80.xxx +R10.2, • N80.xxx +N94.[4,5,6,10,11,12,19]

	FM	IBS	TMD	UCPPS	ENDO	VVD	cLBP	cTTH	MI	CFS
FM										
IBS	10.18									
TMD	5.64	3.70								
UCPPS	9.91	9.10	4.75							
ENDO	4.06	5.05	1.87	18.62						
VVD	3.14	3.97	1.85	24.99	15.56					
cLBP	5.29	2.29	1.24	2.34	2.30	1.20				
cTTH	2.43	1.58	2.64	1.94	1.25	N/A	3.36			
MI	5.27	3.30	6.13	3.29	3.21	1.63	1.99	4.27		
CFS	6.07	2.90	1.48	2.78	1.86	1.19	1.75	1.82	2.67	
<i>diab neurop</i>	2.60	1.66	N/A	0.86	N/A	N/A	2.08	0.51	1.06	1.18
<i>COPD</i>	3.14	1.78	0.89	1.05	0.54	0.50	1.92	0.71	1.11	1.29
<i>chronic viral hepatitis</i>	2.20	1.48	0.56	1.19	N/A	N/A	1.22	0.56	0.68	1.01

Odds ratio =

5+

3-5

1-3

Chronic Overlapping Pain Conditions Screener (COPC-S)

USASP
US ASSOCIATION FOR THE STUDY OF PAIN



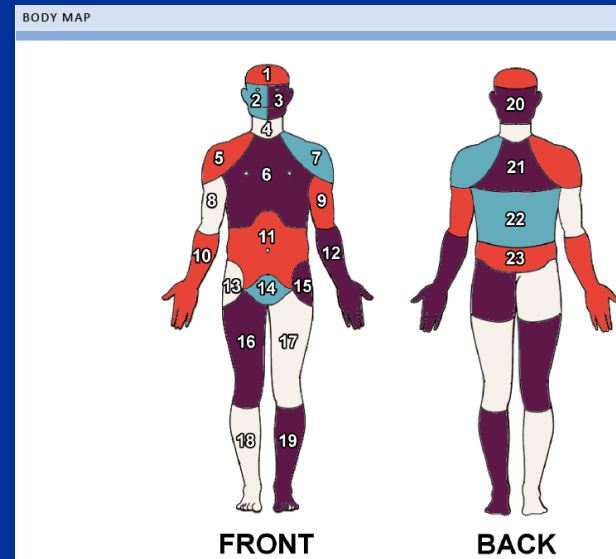
The Journal of Pain, Vol 25, No. 1 (January), 2024: pp 265–272
Available online at www.jpain.org and www.sciencedirect.com

The Chronic Overlapping Pain Condition Screener

Andrew Schrepf,^{*} William Maixner,[†] Roger Fillingim,[‡] Christin Veasley,[§]
Richard Ohrbach,[¶] Shad Smith,[†] and David A. Williams^{*}



<https://copcscreener.com>



Report	
Condition	Class
FM	Y/N
IBS	Y/N
TMD	Y/N
MI	Y/N
TTH	Y/N
IC/CP	Y/N
cLBP	Y/N
ME/CFS	Y/N
ENDO-pain	Y/N
VVD	Y/N
Total	x/10

Stretch Break

Music about Pain

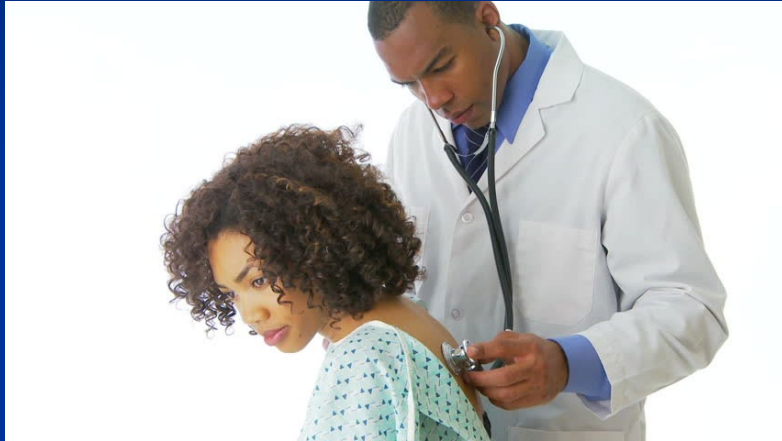
- Pain – Three Days Grace
- Pain – Tupac Shakur
- Pain – Pusha T
- Pain – Jimmy Eat World
- Pain – War on Drugs
- Pain – Hollywood Undead
- Pain – The Used

- Hurt – Johnny Cash
- Everybody Hurts – R.E.M.
- Hurt – Nine Inch Nails

- King of Pain – Police
- No More Pain – 2Pac
- Feel No Pain – Sade
- The Sweetest Pain – Dexter Wansel
- I Feel Pain – A Boogie wit Da Hoodie
- I Can't Stand the Pain - James Brown
- Physical Pain – Future Island

- Give Me Novocain – Green Day
- Pain Killer – Judas Priest
- The Drugs Don't Work – The Verve

Most Pain Care Visits occur within Primary Care



Peterson K, et al.. VA ESP Project #09-199; 2017.

Primary Care Physicians Receive Little Training in Pain Management

- 80% of American Medical Schools have no formal pain education
- Those that do, report 5 or fewer hours
 - Emphasis of education is often cellular and subcellular rather than interpersonal or social in nature
- Only 34% of physicians reported feeling comfortable treating chronic pain
 - Only 1% found it a satisfying practice

Pain Medicine Versus Pain Management: Ethical Dilemmas Created by Contemporary Medicine and Business

John D. Loeser, MD† and Alex Cahana, MD, PhD*†*

Biomedical Model
Interventional
Pain Medicine

- Procedure Driven
- Focus on curing/fixing

Patient is passive recipient

Biopsychosocial model
Interdisciplinary
Pain Management

- Focus on multidisciplinary teams
- Focus on pain management

Patient is active participant

How good is our black bag for treating chronic pain?



Treatment	Impact on Chronic Pain
Long term opioids	32% reduction
Pain drugs generally (across classes)	30% - 40% get 40% - 50% relief
Spinal fusion	75% still have pain
Repair herniated disk	70% still have pain
Repeat Surgery	66% still have pain
Spinal cord stimulators	61% still in pain after 4 yrs. average pain relief 18% across studies

Are Invasive Procedures Effective for Chronic Pain? A Systematic Review

Wayne B. Jonas, MD,* Cindy Crawford,[†] Luana Colloca, MD, PhD,[‡] Levente Kriston, PhD,[§] Klaus Linde, MD, PhD,[¶] Bruce Moseley, MD,^{||} and Karin Meissner^{||,**,§}

Conclusions. There is little evidence for the specific efficacy beyond sham for invasive procedures in chronic pain

Pain Medicine, 20(7), 2019, 1281–1293

doi: 10.1093/pm/pny154

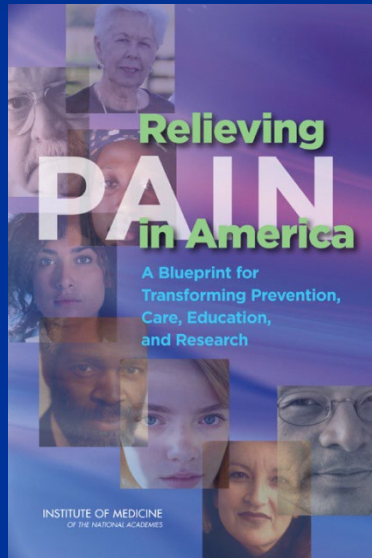
Advance Access Publication Date: 10 September 2018

Review Article

OXFORD

Recommendations in Multiple Federal Documents

Self-Management, Evidence-Based, Patient-Centric,
Multi-Modal Pain Care



What's a doctor to do?

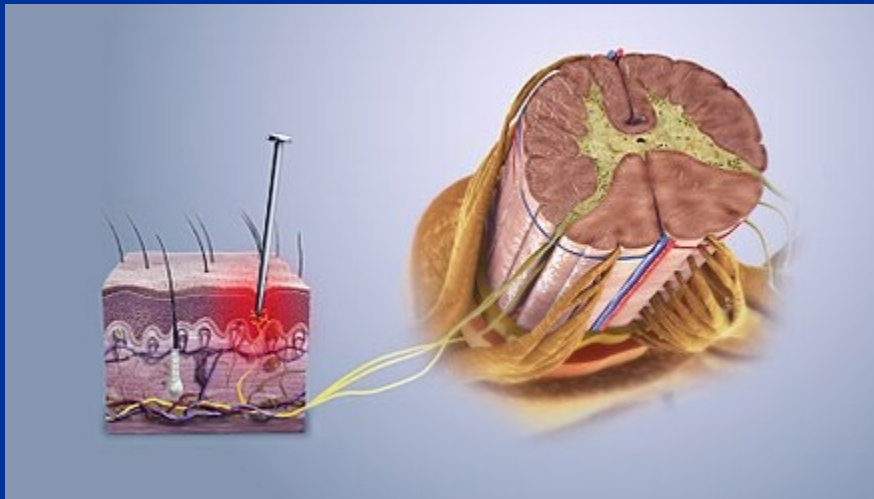


We Need to Approach Chronic Pain Differently

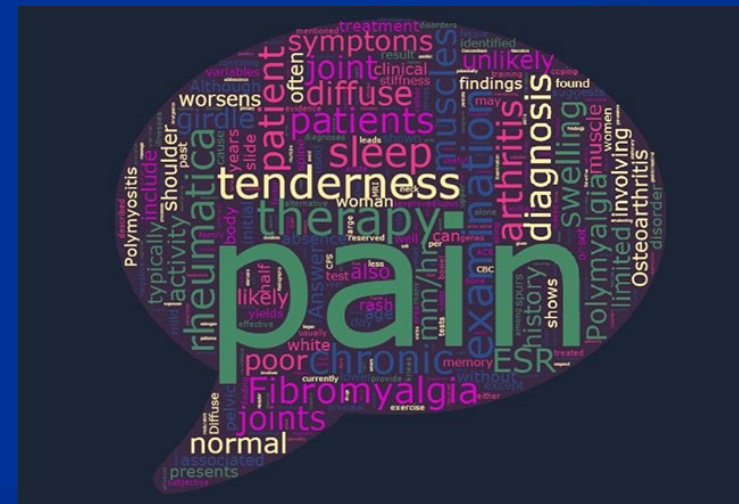


Thinking Differently about Pain

- Damaged tissue and pain are not the same thing
- Sometimes they occur together, so they seem to be the causal
- Nociception provides bodily information that may or may not be interpreted as pain



Nociception



PAIN

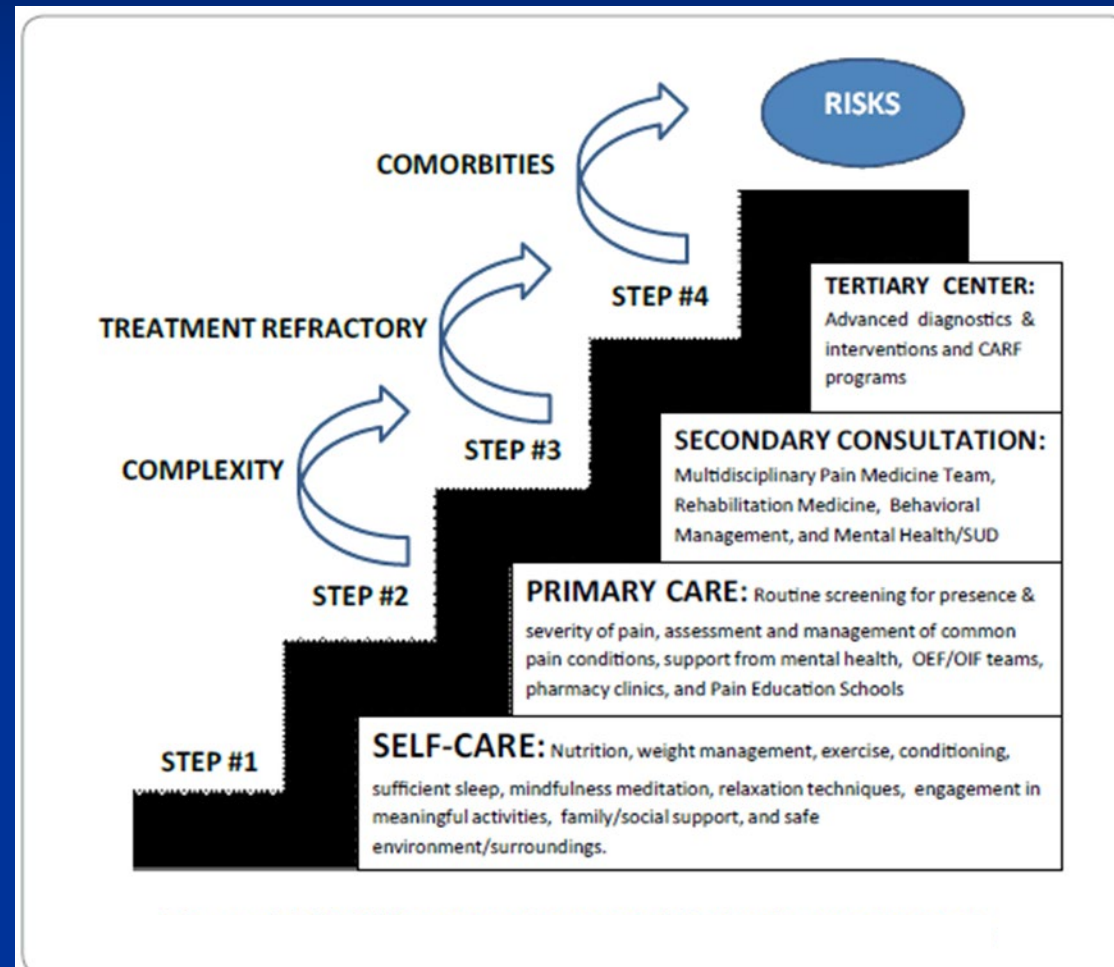
Thinking Differently about Chronic Pain

- Pain is a **Perceptual Experience** formed in the brain
 - Other perceptual experiences with flexible biological associations include the following:
 - hunger, itch, tickle, urinary urgency, orgasm

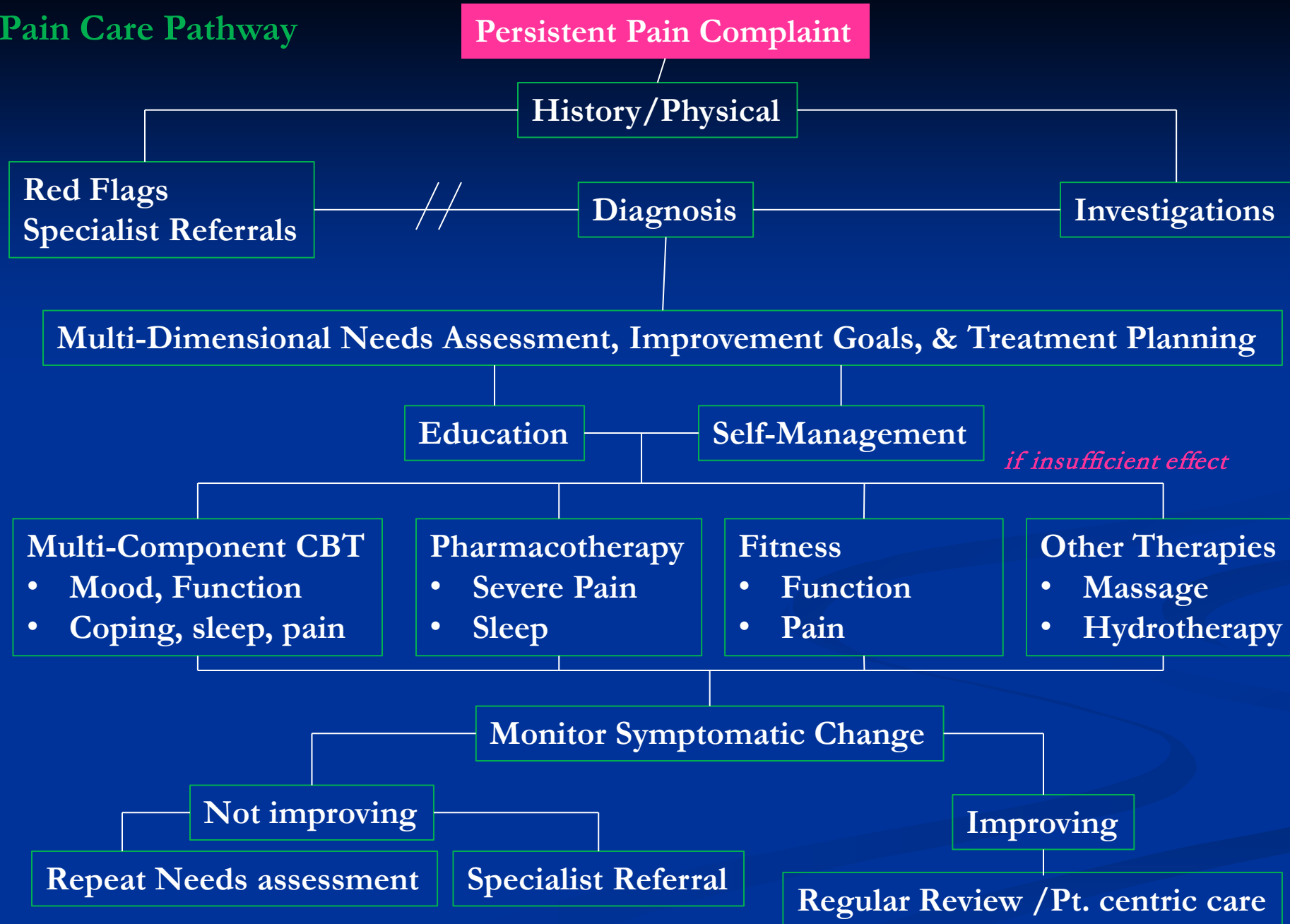
Thinking Differently about Chronic Pain

- Treating a perception requires different techniques than fixing damaged tissues

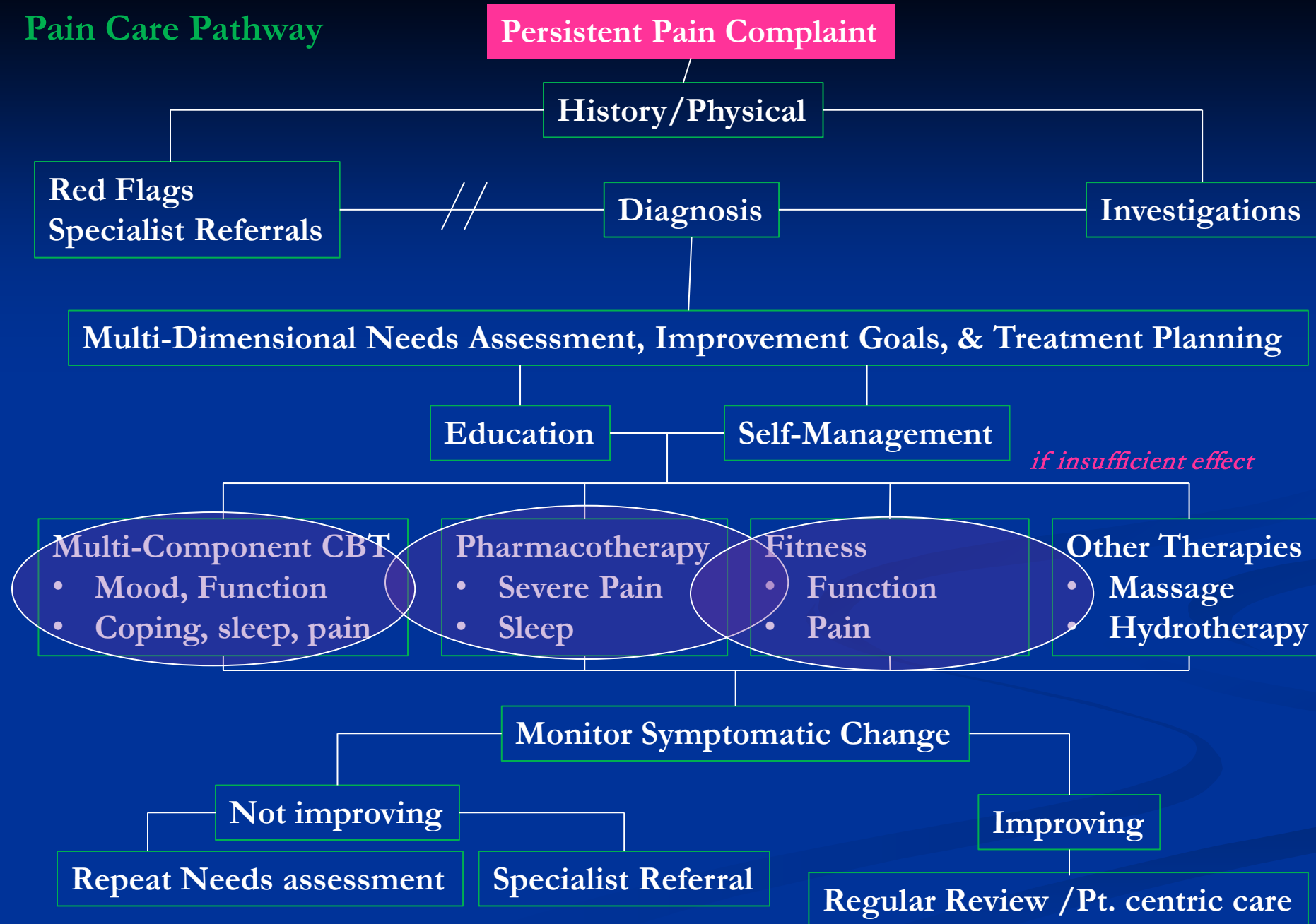
VA's Stepped Care Model of Pain Management



Pain Care Pathway



Pain Care Pathway



Treating Based on Mechanisms

Any combination may be present

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

Modified from Goldenberg et al.
JAMA. 2004;292:2388-95.

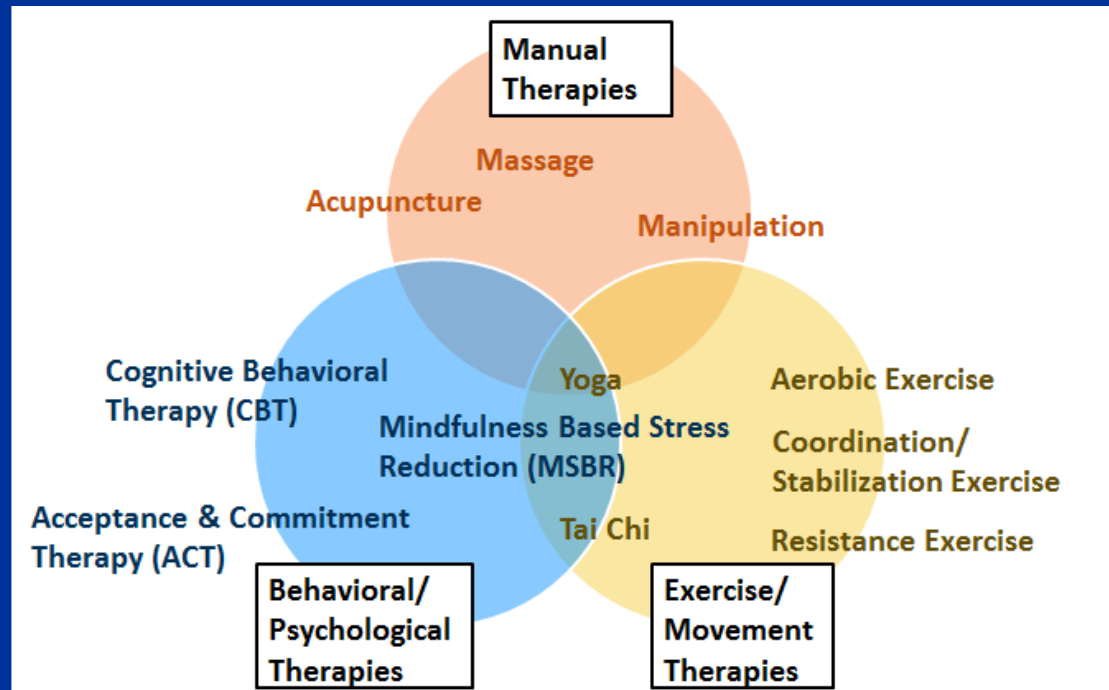
Nonpharmacological Therapies

Strong Evidence	■ Education ■ Aerobic exercise ■ Cognitive behavior therapy (ACT, CBT-i, empowered self-care)
Modest Evidence	■ Strength training ■ Hypnotherapy, biofeedback, balneotherapy, yoga, Tai Chi ■ Neuromodulation ■ Acupuncture, chiropractic, manual and massage therapy
Weak Evidence	■ Trigger point injections
No Evidence	■ Doing nothing

Non-Pharmacological Pain Treatments in VHA

VA State of the Art Conference Nov. 2016: Evidence-based non-pharmacological approaches for MSK pain management

- Evidence to support CIH and conventional therapies.
- Provision of multi-modal therapies accessible from Primary Care.



VHA Directive 1137: Advancing Complementary and Integrative Health (May 2017)

- List 1: Approaches with published evidence of promising or potential benefit.
 - Acupuncture
 - Massage Therapy
 - Tai Chi
 - Meditation
 - Yoga
 - Clinical Hypnosis
 - Biofeedback
 - Guided Imagery
- Chiropractic Care was approved as a covered benefit in VHA in 2004 and is part of VA whole health care.
- To be made available across the system, if recommended by the Veteran's health care team.

Can we use diet/nutrition to treat chronic pain?

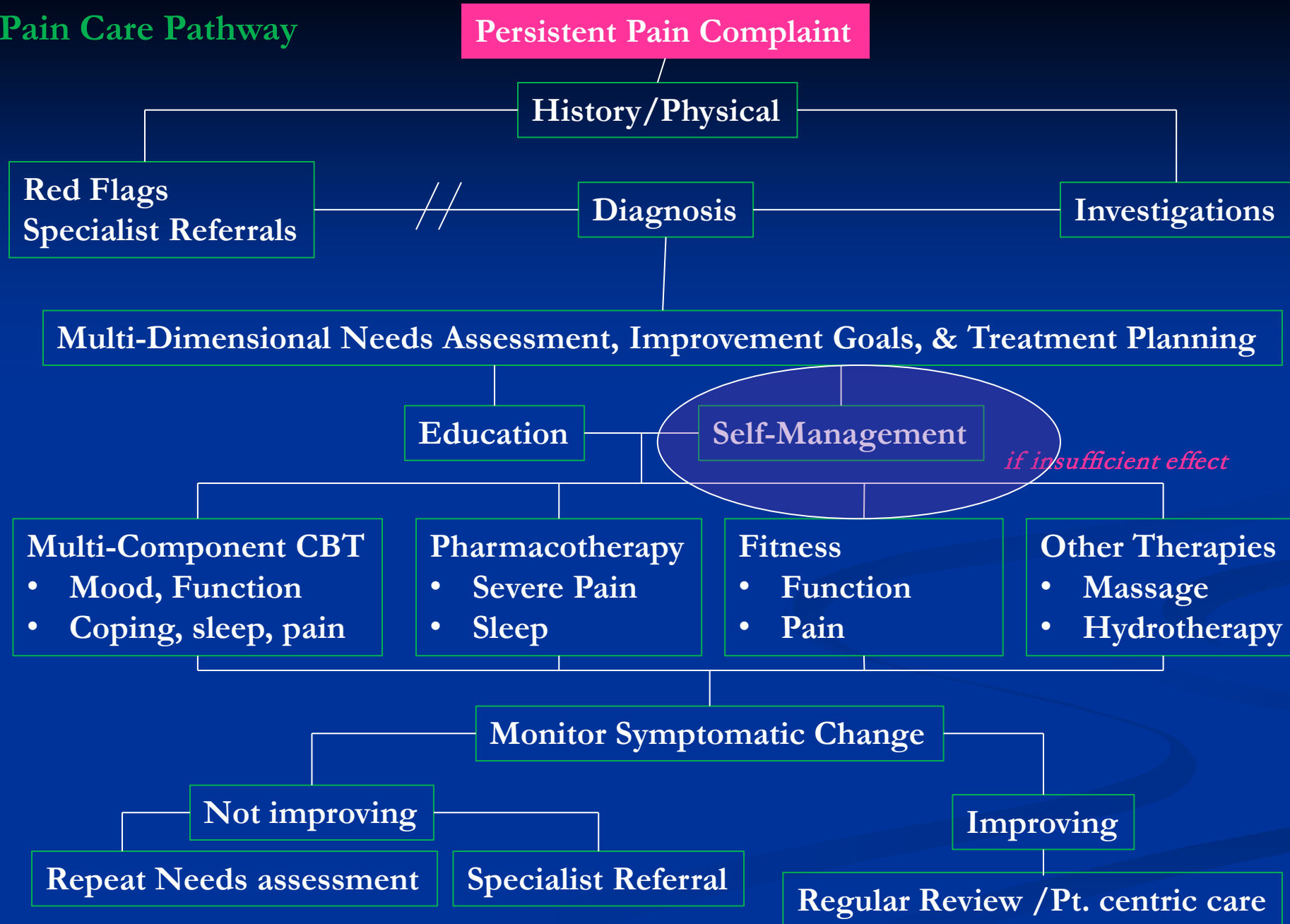
Andrew Schrepf,^{*} Steven E. Harte,^{*} Nicole Miller,[†] Christine Fowler,[†] Catherine Nay,[†]
David A. Williams,^{*} Daniel J. Clauw,^{*} and Amy Rothberg^{†,‡}

^{}Chronic Pain and Fatigue Research Center, Department of Anesthesiology, [†]Department of Internal Medicine, [‡]School of Public Health, University of Michigan, Ann Arbor, Michigan.*

Abstract: Weight loss is known to improve pain localized to weight-bearing joints but it is not known how weight loss affects the spatial distribution of pain and associated somatic symptoms like fatigue. We sought to determine if weight loss using a low-calorie diet improves pain, affect, and somatic symptoms commonly associated with chronic pain conditions in an observational study. We also documented changes in inflammatory markers in serum before and after weight loss. Participants were 123 obese individuals undergoing a 12- to 16-week calorie restriction weight loss intervention. The spatial distribution of pain, symptom severity (eg, fatigue, sleep difficulties), depression, and total fibromyalgia scale scores were measured before and after weight loss. Pain ($P = .022$), symptom severity ($P = .004$), depression ($P < .001$), and fibromyalgia scores ($P = .004$) improved after weight loss; men showed greater improvement than women on somatic symptoms and fibromyalgia scores (both $P < .01$). Those who lost at least 10% of body weight showed greater improvement than those who lost <10%. Levels of the regulatory cytokine interleukin-10 increased after the intervention ($P = .002$). Weight loss may improve diffuse pain and comorbid symptoms commonly seen in chronic pain participants.

Perspective: *This article presents the effect of a weight loss intervention on characteristics of chronic pain, including the spatial distribution of pain and comorbid somatic symptoms. Weight loss appeared to produce larger improvements in somatic symptoms for men.*

Pain Care Pathway



How to ERASE S.P.A.C.E.

Emotions

Reflections

Actions

Sleep

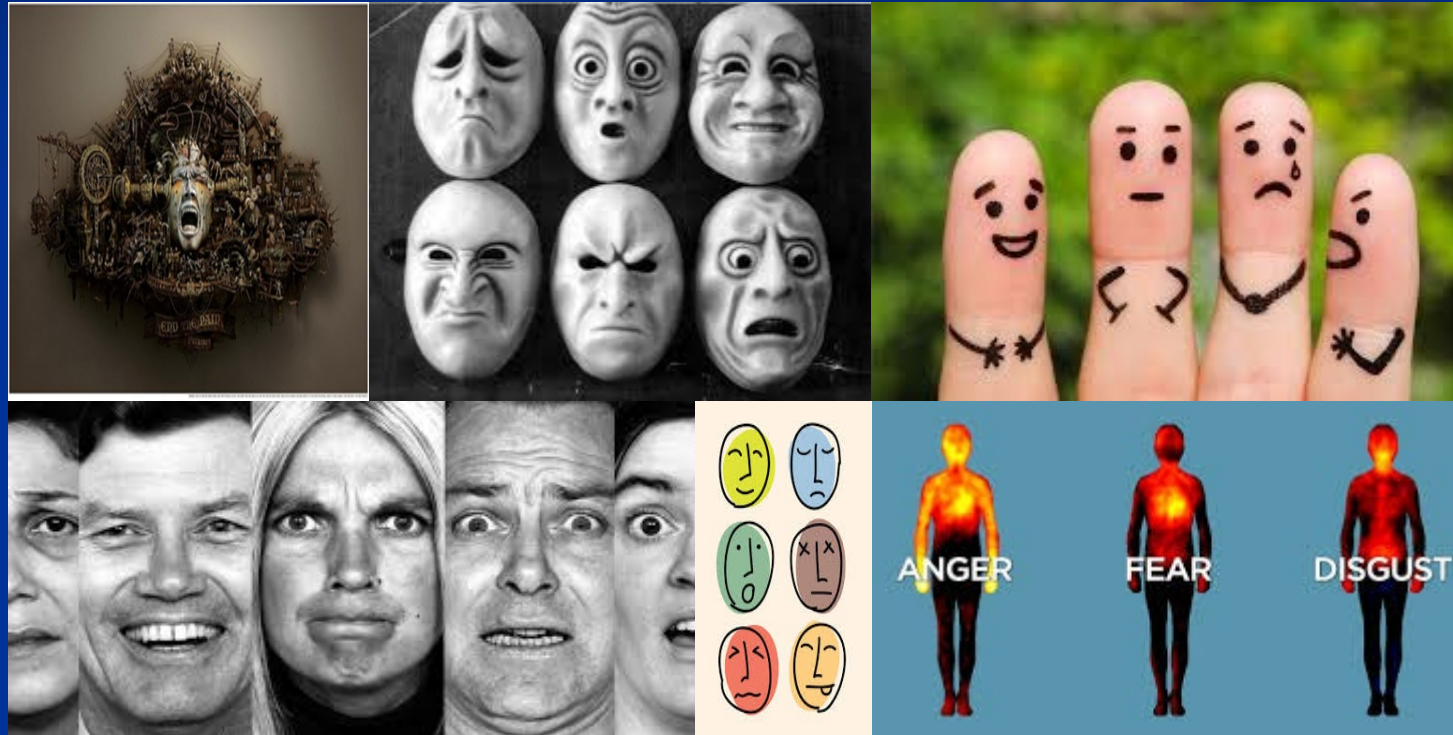
Environment



Sleep, Pain, Affect, Cognitive changes, Energy deficits

ERASE

Emotions



Altering pain perception through Emotions

Patients do not need
to be mentally ill to
have chronic pain



Approaches to Resolve Negative Affect Influencing Chronic Pain



Emotional Awareness and
Expression Therapy (EAET)



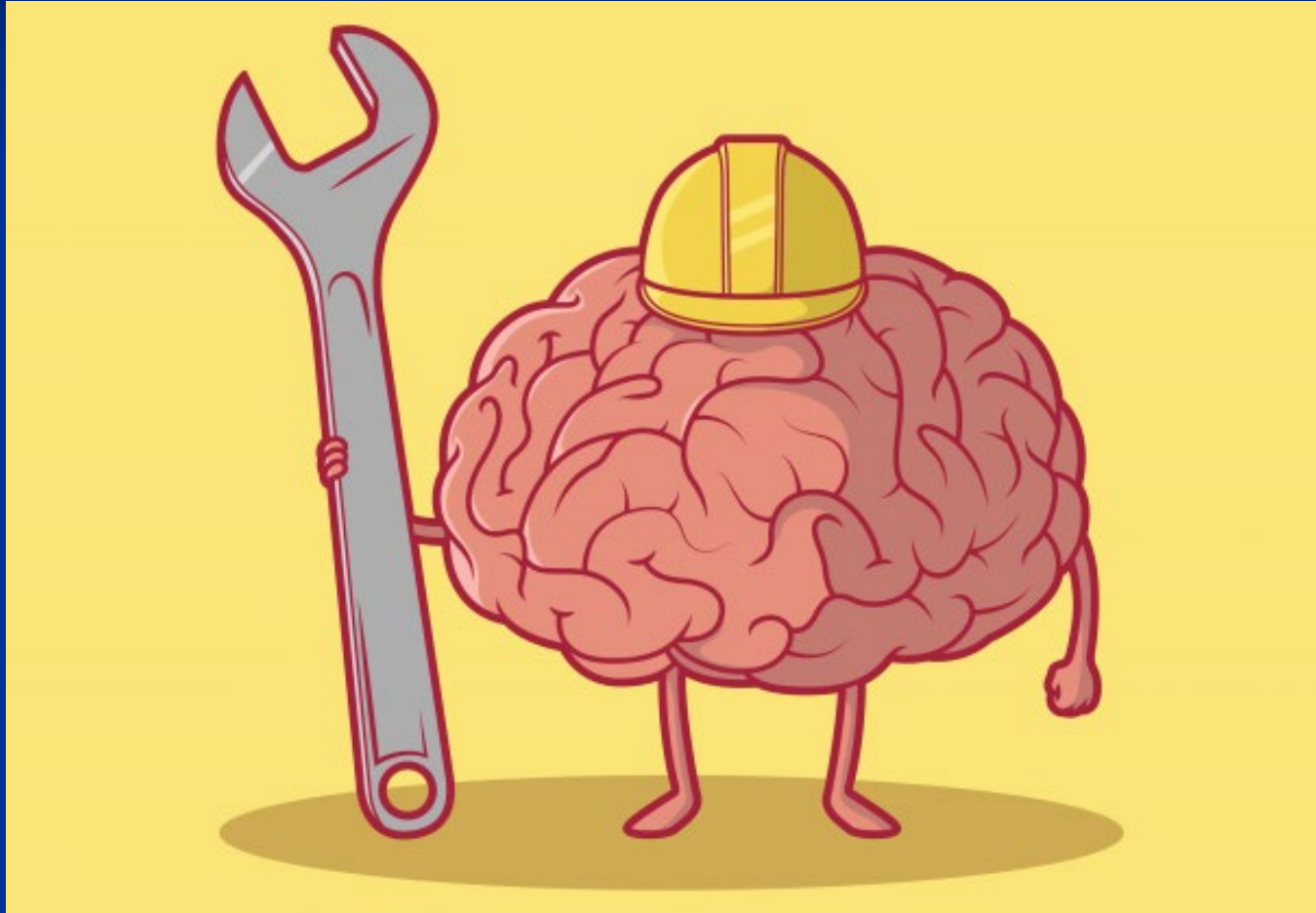
Pleasant Activity Scheduling



Traditional Psychotherapy

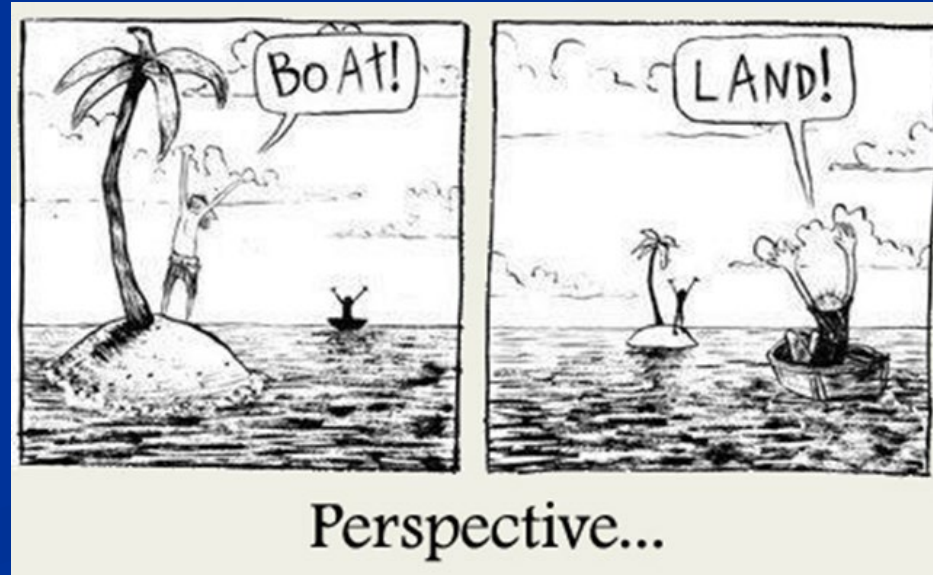
ERASE

Reflections



Using Cognition to alter pain perceptions

Reframing



The Relaxation Response



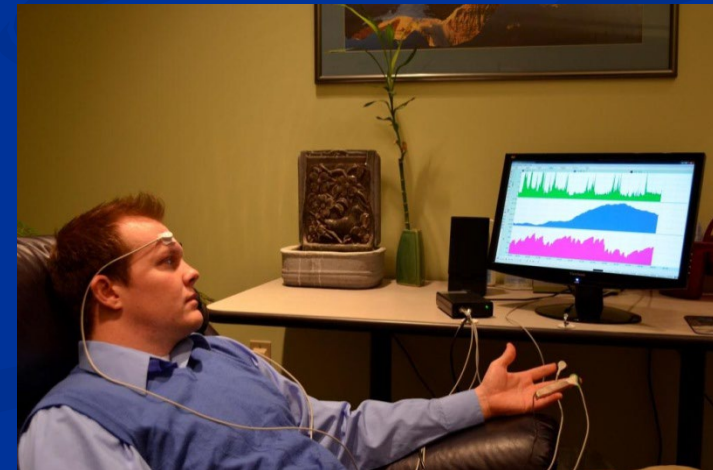
Visual Imagery



Meditation



YOGA



Biofeedback

ERASE

Actions



Using Behavior to alter pain perceptions and
provide a foundation of wellness

Exercise

- Multiple reviews and meta-analyses, and professional society guidelines recommend exercise and physical activity for the treatment of chronic pain and fatigue
- Increase Fitness
- Increase Function



Lifestyle Physical Activity



Pacing for Energy Efficiency

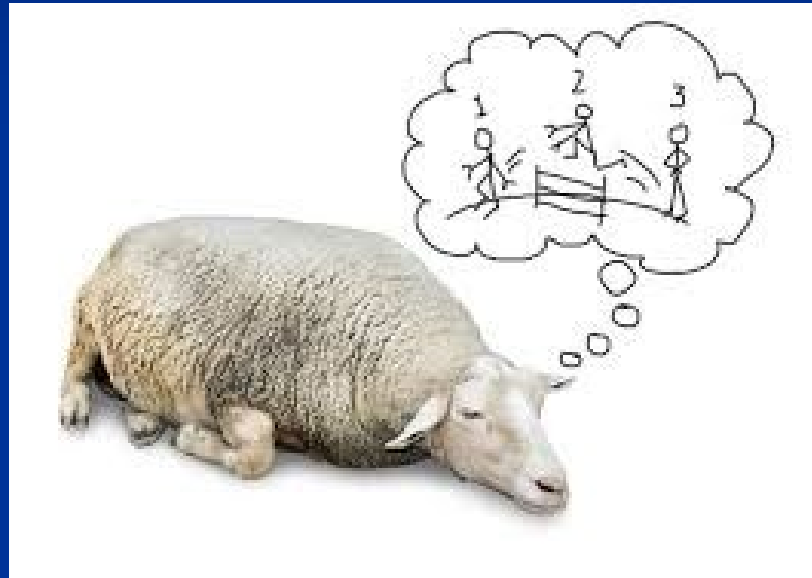


Problem Solving / Goal Setting



ERASE

Sleep



Altering Pain via Sleep

Behavioral and Sleep Hygiene Skills

Timing

Regular bed time/wake time

Sleep Behavior

Get in bed only when sleepy

Use bed for sleep

Get up after 15' if no sleep

Thermal Tips

Decline in core temp signals sleep

Exercise, warm bath before bed

Environment

Steady room temperature

Keep room dark

Ingestion

Decrease nicotine

Decrease Caffeine

Alcohol interferes with sleep

Light snack is recommended

Mental Control

Effort will not produce sleep

Avoid mental stimulation

Seek mental quiescence

Environment



Using the Environment to alter pain perceptions
and provide a foundation of wellness

Social Challenges



Dr. -Patient



Friends



Family

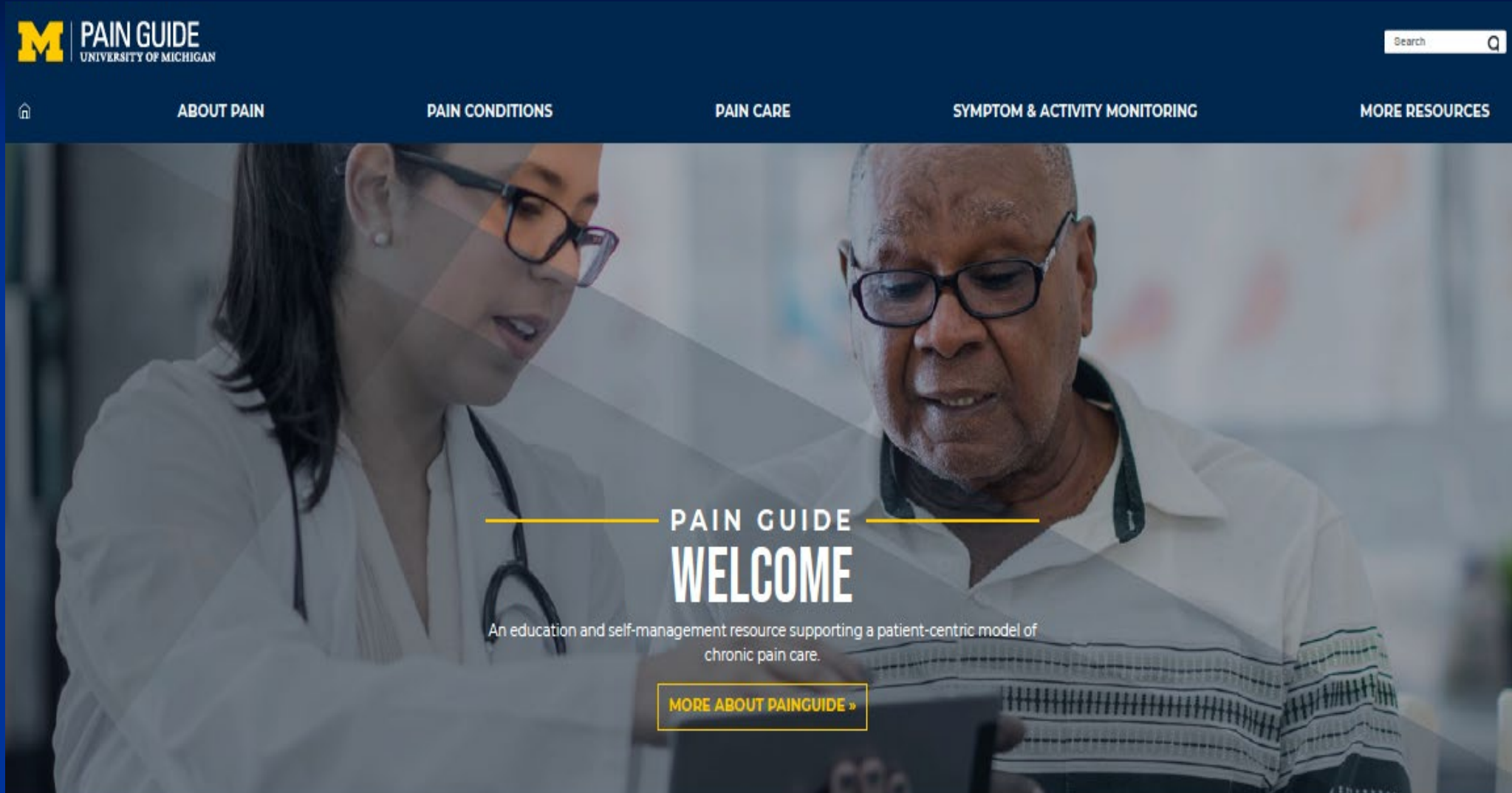


Employer and co-workers

Physical Challenges



Web-based self-management



<http://PainGuide.com>

Self Care



Exercise

Exercise, when done safely, can benefit you physically and mentally. It helps prevent deconditioning of muscles which is often associated with more pain. Studies find that exercise is one of the most beneficial approaches to managing pain.

[Learn more >](#)



Pacing

People with pain often "over do" resulting in pain flare ups. Pacing can allow activities to get accomplished safely, without flare-ups, and in a manner that conserves energy (i.e., with less fatigue).

[Learn more >](#)



Nutrition & supplements

Eating a healthy diet has many benefits for everyone; however there may be some specific benefits for pain sufferers. The examination of pain and diet is an emerging literature.

[Read nutrition & supplements tips >](#)



Relaxation

Teaching the body to relax can both diminish muscle tension and decrease stress. To work properly, regular practice is needed so that the body learns a rhythm of relaxation and can relax on your command. Less tension and less stress can lead to decreased pain intensity.

[Learn more >](#)



Reframing

What we think influences how we feel and how much pain we experience. Sometimes negative thoughts become automatic and make us feel worse. Learning to reframe our thinking in realistic terms that challenge negative automatic thinking can help diminish pain intensity.

[Learn more >](#)



Managing Emotions

Emotions are integral to the production of pain. You cannot have pain without emotions. Thus anything we can do to alter the emotional content of one's brain will influence pain. Better management of stress can influence pain as well as engaging in pleasant activities. The pleasant activities will help diminish pain intensity.

[Learn more >](#)



Communication skills

Conflictual social relationships with family, friends, doctors, and employers can make pain worse. Alternatively, these same relationships can be used constructively to make pain better. Communication skills can help make social relationship work in your favor.

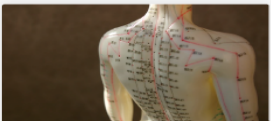
[Learn more >](#)



Sleep

Pain and Sleep are closely related such that poor sleep can make pain worse. These are a number of behavioral sleep strategies that can be used to get a more refreshing night's sleep.

[Learn more >](#)



Acupressure

Like acupuncture, which uses needles, acupressure is an ancient treatment that uses the pressure of one's own finger on the skin so as to help re-balance the flow of energy through the body as a means of reducing symptoms such as pain.

[Learn more >](#)



Spirituality

The belief in something "bigger," "more powerful," or "more knowledgeable" than oneself has been key to many individuals being able to successfully deal with pain. Spirituality may refer to a specific religious belief or it can be any belief that provides a source of strength and comfort to the individual with pain.

[Learn more >](#)



Ergonomics/Posture

How you sit, stand, transition and lift can either make pain worse or allow you to function even with pain. This section offers help in optimizing how you interact with your environment in ways that don't exacerbate pain.

[Learn more >](#)



Resilience

We often focus on fixing what is broken but we can't lose sight of our personal strengths that help us get through challenging times. Finding our sources of resilience can be a valuable tool for reducing pain and living a quality-filled life.

[Learn more >](#)

SYMPTOMS

Sleep

Pain

Affect

Cognitive Function

Energy / Fatigue

BEHAVIORS

Physical Activity

Pacing

Self-care Worksheets

AFFECT



September 17, 2020

September 16, 2020

PAIN CARE

Self Care

Professional Care

Medications

Therapies

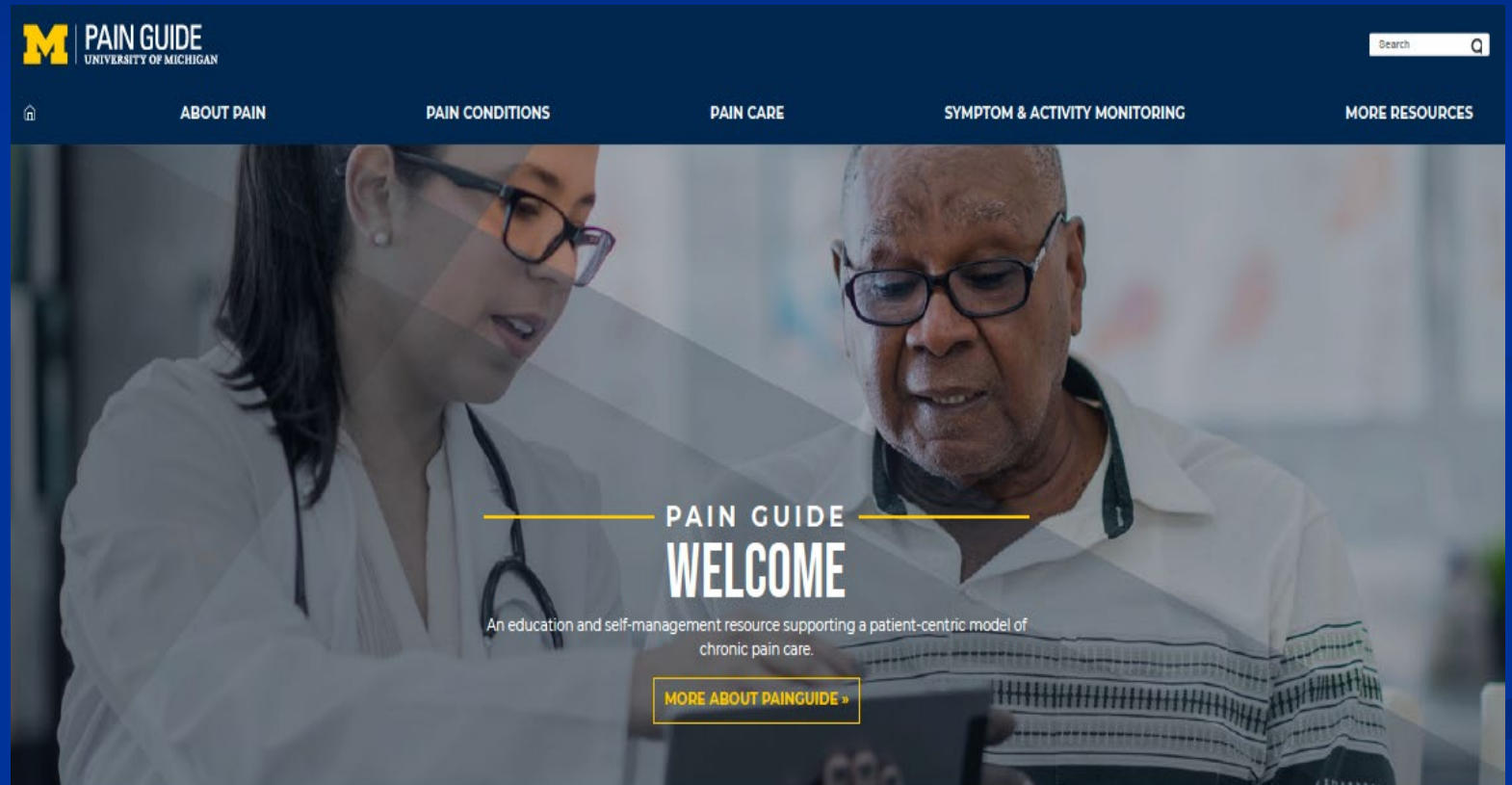
Devices

Procedures



Pain Guide

can serve as the foundation for guided interventions



Bottom Line

- 1. Pain is not located in a body part. It is a perception and needs to be treated as a perception.
- 2. Taking time to just listen to the patient's story is a necessary part of pain treatment. You will be establishing rapport and identifying pain and non-pain treatment targets.
- 3. If you recommend self-management (exercise, relaxation, sleep hygiene etc.), ask about it with the same enthusiasm and regularity that you ask about drugs. Patients learn what you think is really important by what you ask about.

