UNRAVELING CHRONIC PAIN:
DIAGNOSING AND TREATING FIBROMYALGIA

Dana Harrell- Sanders
"Do You See What I Feel?"

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CME ACCREDITED UPDATES IN MEDICINE ELEARNING SERIES

COURSE NAME:
Medicine RSS eLearning Modules

CME eLEARNING ACTIVITY NAME:
Unraveling Chronic Pain: Diagnosing and treating Fibromyalgia

PROGRAM DESCRIPTION, EDUCATIONAL GOAL AND RATIONALE:
Evidence based guidelines are constantly changing and being updated for several core areas of Internal Medicine throughout the year. It is important for physicians to practice the most up-to-date standard of care in all specialties to promote patient health and well-being. Our series of lectures at the medicine regularly scheduled series promotes continuing education for the practicing internist and highlights important updates in medical practice in these core areas. Physicians in general practice often and do not have the time to keep themselves up-to-date with medical advances as they are busy seeing patients in the clinical setting. The Medicine Regularly Scheduled Series gives these physicians the opportunity to learn these advances in an academic setting.

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TARGET AUDIENCE:

Physician Partners and Premium Network
community-based providers

LEARNING OBJECTIVES:

- To recognize Fibromyalgia (FM): primary and secondary.
- To differentiate mechanism of acute vs. chronic pain.
- Identify and explain the evidence to support a pathophysiologic basis for FM.
- State the most significant recommendations for treatment.
- Identify resources that can be used to help patients that live with FM and recognize need to refer when necessary.

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COURSE HOST:
Department of Medicine
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ESTIMATED TIME TO COMPLETE ACTIVITY:
90 minutes

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FACULTY DISCLOSURES:

Drs. Sandy Balwan, George Boutis, John Raimo and Sean LaVine have nothing to disclose. Dr. Stamatos disclosures are on the next slides.

RELEASE DATE:	2/28/19
REVIEW DATE:	2/28/19
PROGRAM EXPIRATION:	7/30/19

Disclosures

- Pfizer Medical Outcome Specialist

Objectives

- Recognize fibromyalgia (FM)
  - Primary: no other explanation for chronic pain
  - Secondary: outcomes impacted by presence of FM
- Differentiate mechanism of acute versus chronic pain
- Explain the evidence to support a pathophysiologic basis for FM
- State the most significant recommendations for treating FM
  - Non opioid management
  - Maintain work, even if needs to be adjusted-
- Identify resources that can be used to help patients live with FM and recognize need to refer when necessary

- Arnold, L. M., et al. (2016). Fibromyalgia and chronic pain syndromes: A white paper detailing current challenges in the field. Clin J Pain; 32(9): 737-746.
- *Atzeni, F. (2019). Review: One year in review 2019: Fibromyalgia. Clin & Exp Rheum; 37 (Suppl. 116): S3-S10. **
- Clauw, D. (2015). Diagnosing and treating chronic musculoskeletal pain based on mechanisms. Best Practice & Research Clinical Rheumatology; 29(1): 6-19.
- Dowell, D., Haegerich, R., & Chou, R. (2016). CDC Guideline for prescribing opioids for chronic pain- United States, 2016. JAMA; 315(15): 1624-1645.
- Fitzcharles, M.A. (2013). 2012 Canadian guidelines for the diagnosis and management of fibromyalgia syndrome: Executive summary. Pain Res Manag; 18(3): 119-126.
- Hauser, W., & Fitzcharles, M. (2019). Facts and myths pertaining to fibromyalgia. Dialogues Clin Neurosci; 20(1): 53–56.
- *Harris, R. & Clauw, D. 2006. How do we know that the pain in fibromyalgia is real? Current Pain and Headache Reports; 10(6): 403-407. **
- Lopez-Sola, M., et al. (2017). Towards a neurophysiological signature for Fibromyalgia. Pain; 158(1): 34-47.
- Macfarlane GJ et al. (2016). EULAR revised recommendations for the management of fibromyalgia. Ann Rheum Dis; 0: 1-11. doi:10.1136/annrheumdis-2016-209724.
- F. Wolfe et al. (2016). 2016 Revisions to the 2010/2011 fibromyalgia diagnostic criteria. Seminars in Arthritis and Rheumatism 46 (2016) 319–329

Key Evidence Based Articles

- https://www.youtube.com/watch?v=STmQm-nHS08

Art courtesy of PainExhibit.org

"Crucified by Pain"

June 28th, 2013 by Dana Harrell-Sanders
This painting represents those that suffer from fibromyalgia and chronic fatigue. Sometimes it's hard to put into words what those of us with these syndromes feel. I hope my art expresses it to those that don't understand.

WIDESPREAD PAIN

STIFFNESS

SLEEP DISTURBANCE

COGNITIVE DIFFICULTIES

MOOD DISTURBANCE

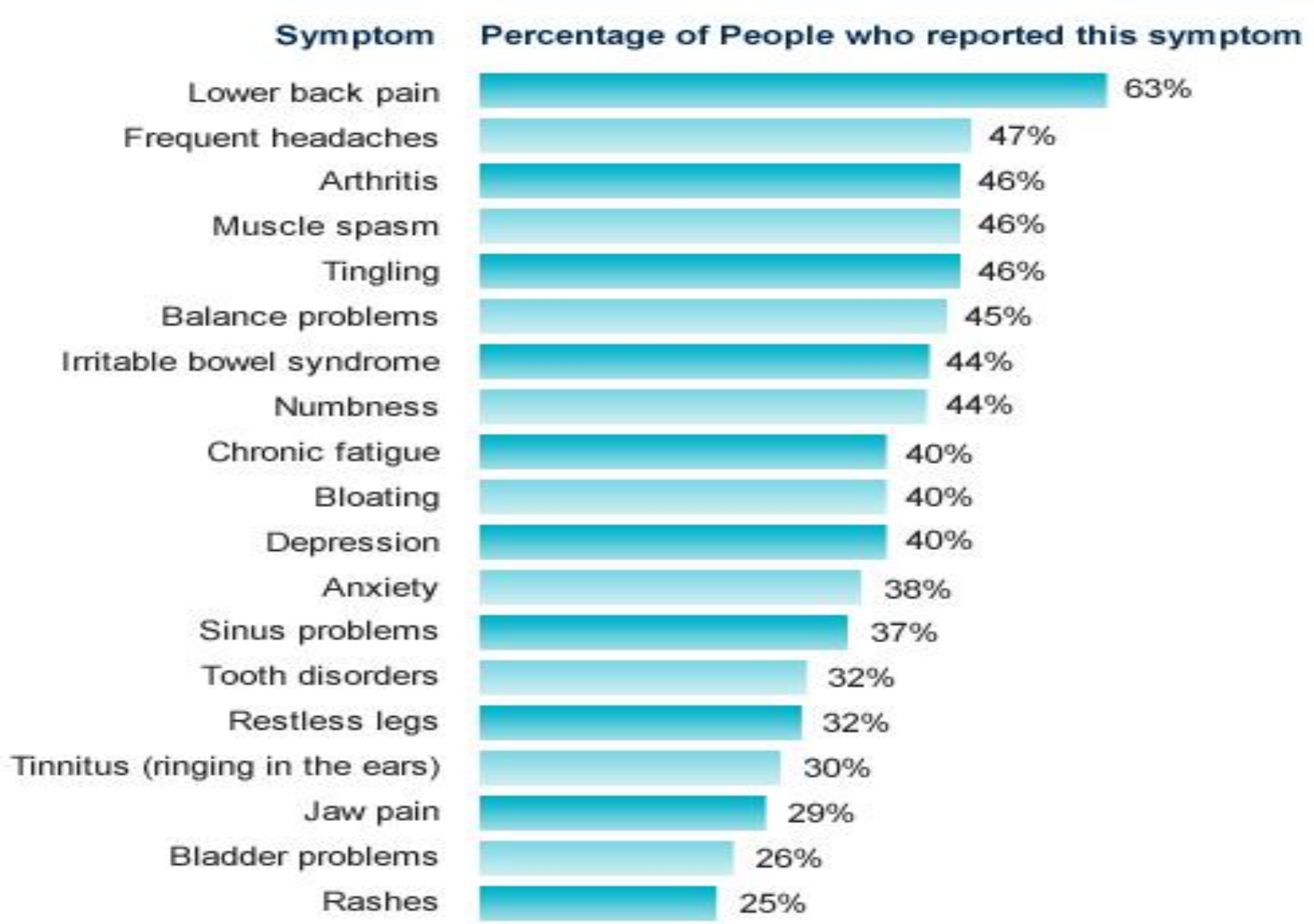
Here's what it feels like

Fibromyalgia

- “There has to be something wrong… you can’t feel this bad”
- “ I hurt all over”
- “It feels like I always have the flu”
- “I’m always so tired”
- “I can’t fall asleep and when I do, I wake up all the time”
- “I have numbness and tingling sometimes here, sometimes there…”
- “ I feel like I can’t think straight, trouble focusing, remembering”
- “All my tests are negative, why do I feel like this?
- “I’ve been to neurology, gastroenterology, ortho, endocrinology, no one knows what’s wrong”

What does it sound like?

National Fibromyalgia Association "snapshot" 2005 3 Day survey



Bennett, R. (2007). Internet survey 2,569 people with FM. BMC MSK Disor; 8: 27.

Condition	Description	%
Irritable Bowel Syndrome	Constipation, diarrhea, bloating	32-80%
Temporal Mandibular Dysfunction	Facial/ jaw pain, limited opening	75%
Chronic Fatigue Syndrome	Unexplained, fatigue	21-80%
Headaches	Lasting > 30 mins	10-80%
Multiple Chemical sensitivities	Cause unpleasant symptoms	33-55%
Interstitial Cystitis	At least 8 months pain, urgency, frequency	13-21%
Restless Leg Syndrome	Unpleasant urge to move legs	32%
Numbness	Migratory tingling, pins, needles	44%

Bennett, R. (2007). Internet survey 2,569 people with FM. BMC MSK Disor; 8: 27.

Pain Epidemic in America

BY THE NUMBERS:

- >116 Million people
- 20% chronic pain
- 8% High impact chronic pain:
- Costs $ 560-635 Billion/ year
- More than DM, CAD, CA combined!
- 14% of all Federal HC $$ attributable to pain
- Nearly $2,000 /person living in the US

Institute of Medicine: Pain in America 2011
Dahlhamer, J., et al. (2018). Prevalence of chronic pain… US, 2016. MMWR;67(36): 1001-1005.

- Prevalence:
  - 2-4% population est 5 million adults… 2nd only to OA
    - 16% OA
    - 21% RA
    - 36% SLE
    - Unknown: SS, AS, PsA-
    - 75% go undetected… imagine that!
  - 7-8:1 ratio female: male* in Clinical settings
  - 1-2:1 Epidemiology studies using 2010/11-2016 criteria (survey criteria)
  - 17 missed days work vs. 6 without…

- Morbidity & Mortality
  - Not higher but morbidity is…
  - Death rates from suicide and injuries higher (OR 3.31 suicides/ 1.45 accidental deaths)
  - "will never cause destruction except to personal life"
  - Disability up from 20% in 1996 to 31% in 2015
  - Avg costs $3,400-3,600 annually direct with total costs as high as $7,945!! (ER, OV, procedures/ tests, hosp)
  - Indirect costs can be as high as $8,285 (absenteeism, unemployment, and disability)

Fitzcharles, M. A., Perrot, S., & Hauser, W. (2018). Comorbid fibromyalgia. Eur J Pain; 22: 1565-1576.
Walitt, B., Nahin, R., Katz, R., Bergman, M., & Wolfe, F. (2016). Plos one; 10(9): doi 10.1371
Wolfe, F., et al. (2011). A, C & R; 63(1): 94 & Wolfe, F. et. Al (2013). A, C & R; 65(5): 777
Chandran, A., et al. (2012). J Manag Care Pharm; 18(6): 415
Jones, G.T., et al (2015). A & R; 67(2): 568

Epidemiology

Prevalence at Northwell

- Retrospective EMR review 2015-2016
- 41,739: 79% female
- 1,600 in Division of Rheumatology alone!
- Medications: most frequent Rx…
  - **Glucocorticoids**
  - **Opiates**
  - **NSAIDs**
  - Of Note: Less than 1%:
    - Anticonvulsants
    - SSRI
    - SNRI
    - TCA

Prevalence of Myalgia/ FM dx in Rheumatology Nationally

Rheumatology Informatics System Effectiveness: 55 sites, 239,302

Table 2. Selected rheumatologic diagnoses captured in the RISE registry*

Diagnosis at last encounter	ICD-9 codes	No.
Degenerative joint disease		
OA, generalized or localized	715.00, 715.04, 715.09–715.18, 715.20–715.38, 715.80, 715.89	76,381
Inflammatory rheumatic diseases		
RA	714.0, 714.1, 714.2, 714.81	60,102
Polymyalgia rheumatica	725	7,850
Sjögren's syndrome	710.2	15,800
SLE	710.0	13,940
Psoriatic arthritis	696.0	13,550
Spondyloarthritides	720.0–720.2, 720.8, 720.89, 720.9, 729.9	10,265
Vasculitis		
Temporal arteritis	446.5	1,596
Granulomatosis with polyangiitis	446.4	686
Behçet's disease	136.1	301
Henoch Schonlein	287.0	106
Takayasu disease	446.7	85
Goodpasture's syndrome	446.21	4
Scleroderma	710.1	2,754
JIA	714.3, 714.31–714.33	1,342
Dermatomyositis/polymyositis	710.3, 710.4	2,366
Sarcoidosis	135	1,548
Relapsing polychondritis	733.99	886
Crystalline arthropathies		
Gout	274.xx	9,887
CPDD	275.49, 712.1–712.3, 712.8	1,131
Pain syndromes		
Myalgia or myositis (fibromyalgia)	729.1	49,345
Low back pain	724.1	34,768
Infectious arthritis		
Lyme disease	88.81	913
Septic arthritis	711.xx	284

* All data reflect values at end of last observed clinical encounter. Diagnoses are not mutually exclusive across diagnostic categories; for example, a patient may be captured twice in the Table if they have both rheumatoid arthritis (RA) and osteoarthritis (OA). RISE = Rheumatology Informatics System for Effectiveness; ICD-9 = International Classification of Diseases, Ninth Revision; SLE = systemic lupus erythematosus; JIA = juvenile idiopathic arthritis; CPDD = calcium pyrophosphate deposition disease.

49,345
+ 34,768
84,113 Pain States

Rise Registry

Yazdany, J., et al. 2016. Rheumatology Informatics System for Effectiveness. A, C & R; ; 68(12): 1866-73.

Fibromyalgia & Mood Disorders

Risks and Consequence

- Depression 21-83%
- Anxiety 18-60%
- Depression & Anxiety 30-50%
- PTSD as much as 23%
- Bipolar as much as 21%
- Substance Abuse Disorder up to 25%

- Suicide rate 10 x HIGHER then General Public
- And 3 x more at risk than other chronic pain patients

- *Certal, C., et al. (2018). The impact of sleep in fibromyalgia, an exploratory study. J Psych & Clin Psychiatry; 9(5): 456-459.*
- *Guglielmo, D., et al. (2018). Sx of anxiety & depression adults with arthritis- US, 2015-2017. MMWR; 67(39): 1081-1087.*
- *Hooten, W. M. (2018). Chronic pain and mental health disorders: Shared neural mechanisms, Mayo Clin Proc; 91(7): 955-970.*
- *Mckernan, L. Lenert, M., Crofford, L., & Walsh, C. (2018). Outpatient engagement lowers predicted risk of suicide attempts in fibromyalgia. Arthritis Care & Research. doi: 10.1002/acr.23748*

Good News

- Little change over time:
  - Hoskin 2018
- Face-Face time matters:
  - Those without SA spent up to 40% more face-face time then those that attempted Suicide.
  - Those without SI spent 3 x more face-face
  - McKernan 2018
- Both more likely with Younger age, Mental illness, Co-morbid illness & Frequent inpatient admissions…
  - Suicide Ideations: more polysomatic sx
  - Suicide Attempts: obesity & **drug dependence!**

Mckernan et al. (2018). Arthritis Care & Research. doi: 10.1002/acr.23748
Hoskin, T., Whipple, M., Nanda, S., & Vincent, A. (2018). Arthritis Research & Therapy; 20: 37.

Clusters of FM patients

Low D & A	High D & A	
Cluster I Low D & A Low Pain	**Cluster III** High D & A Low Pain	**Low Pain**
Cluster II Low D & A High Pain	**Cluster IV** High D & A High Pain	**High Pain**

- *Vincent, A. et al. (2014). Arthritis Research & Therapy; 416: 463.*
- *Hoskin, T., Whipple, M., Nanda, S., & Vincent, A. (2018). Arthritis Research & Therapy; 20: 37.*

Prevalence of FM and Use of Opioids

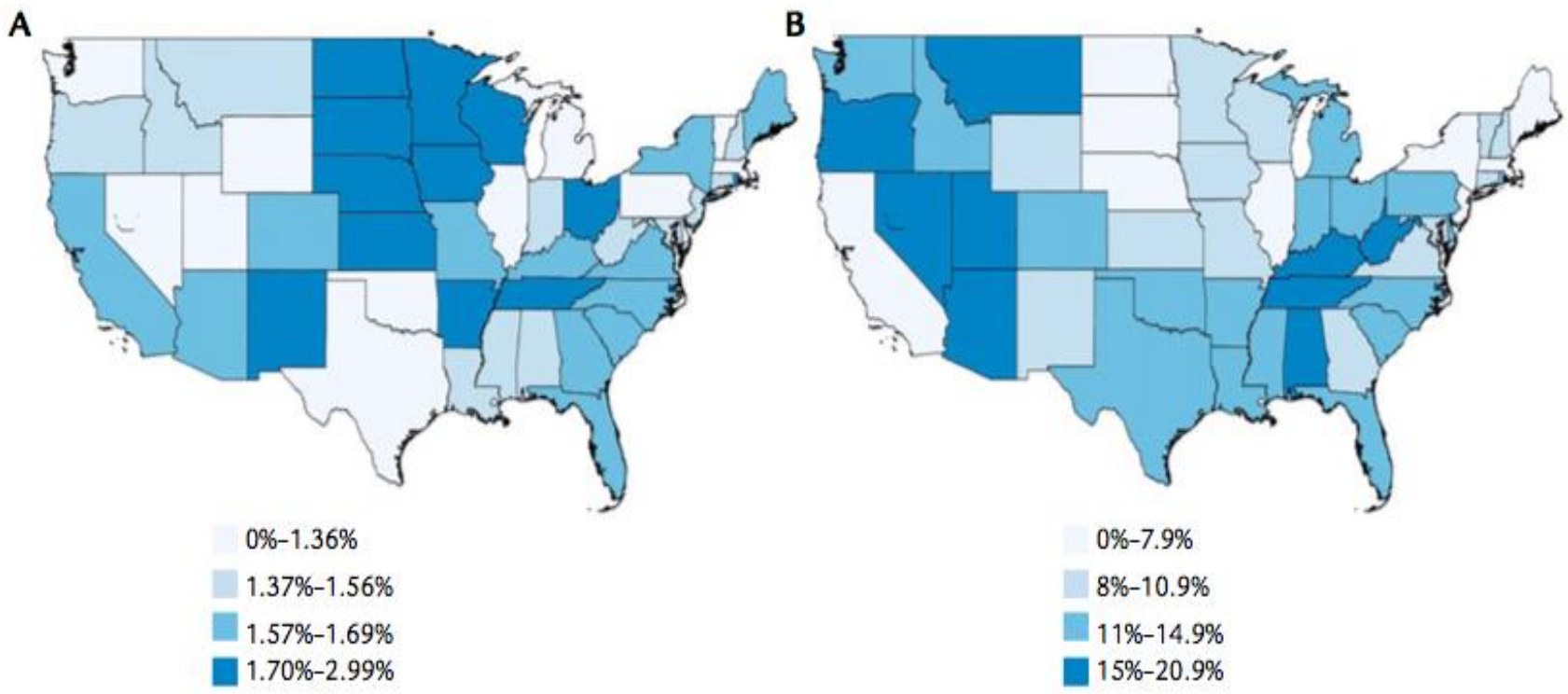


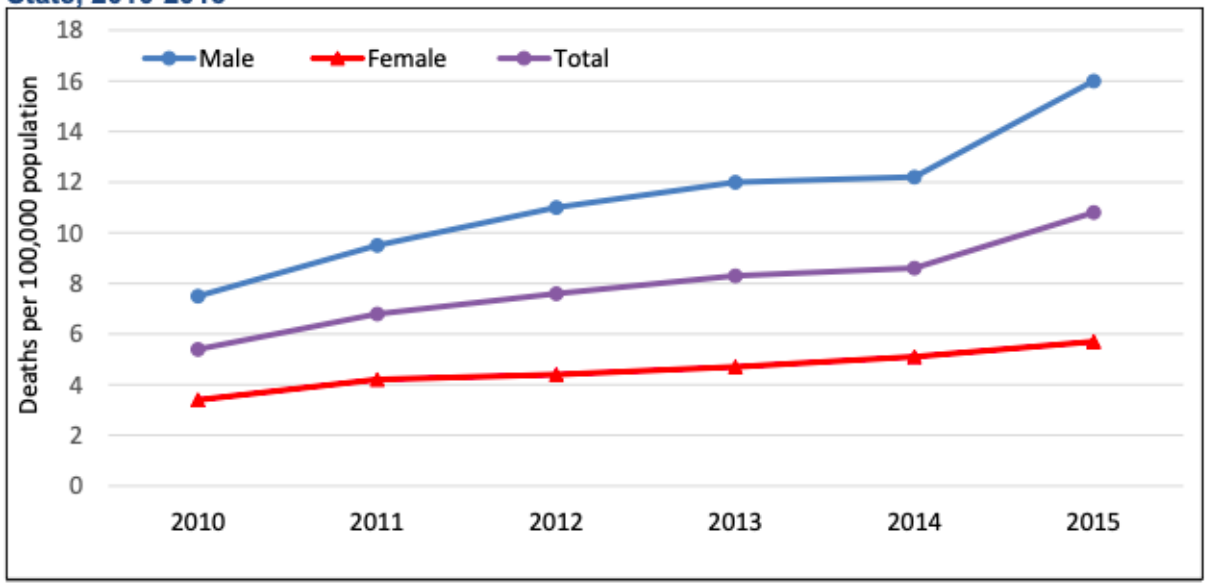
Figure. (A) Prevalence of fibromyalgia. (B) Patients with fibromyalgia receiving chronic opioid therapy. Patients were classified by using International Classification of Diseases, Ninth Revision, Clinical Modification code 729.1.

Commercially Insured 2007-2009 10-30% patients on Chronic Opioids

Painter, J., Crofford, L., & Talbert, J. (2013). Geographic opioid use in FM. Clin Ther; 35(3): 303-311.

Figure 2 shows the annual trends from 2010 to 2015 for the age-adjusted rates of all opioid overdose deaths per 100,000 population by gender, as well as the total rate for NYS. The rate of all opioid overdose deaths per 100,000 population in New York was consistently higher for males than females, although the rate of all opioid overdose deaths steadily increased for each gender. In 2015, the rate for males (16.0) was almost three times higher than the rate for females (5.7).

Figure 2. Age-adjusted Rates of Overdose Deaths Involving Opioids by Gender, New York State, 2010-2015



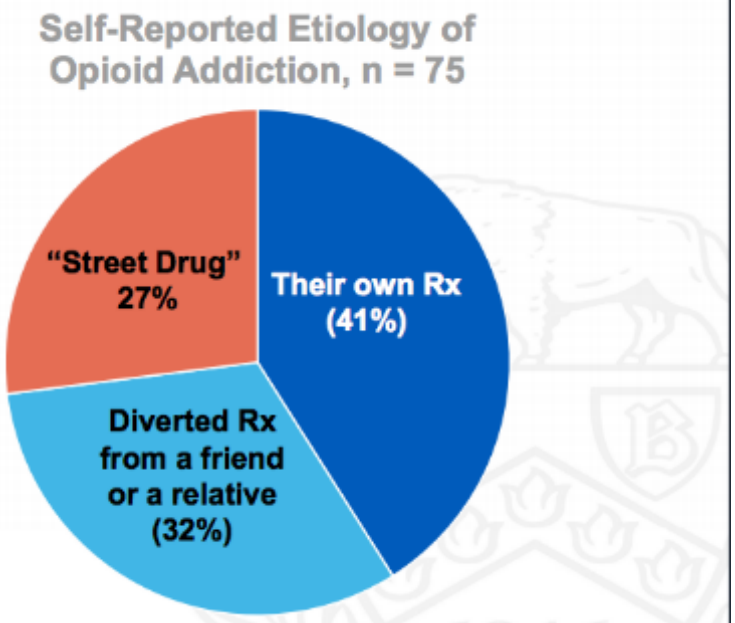
Source: CDC Wonder

The Numbers:

- 1 person every 19 mins killed
- 2012 NY 259 million Rx = one Rx for every American adult!
- 2 out of 5 teens in LI abused Rx drugs!

Prescription drugs serve as "gateway drugs" to illicit drug use.

Patients who are prescribed opiates for acute pain can develop an addiction.



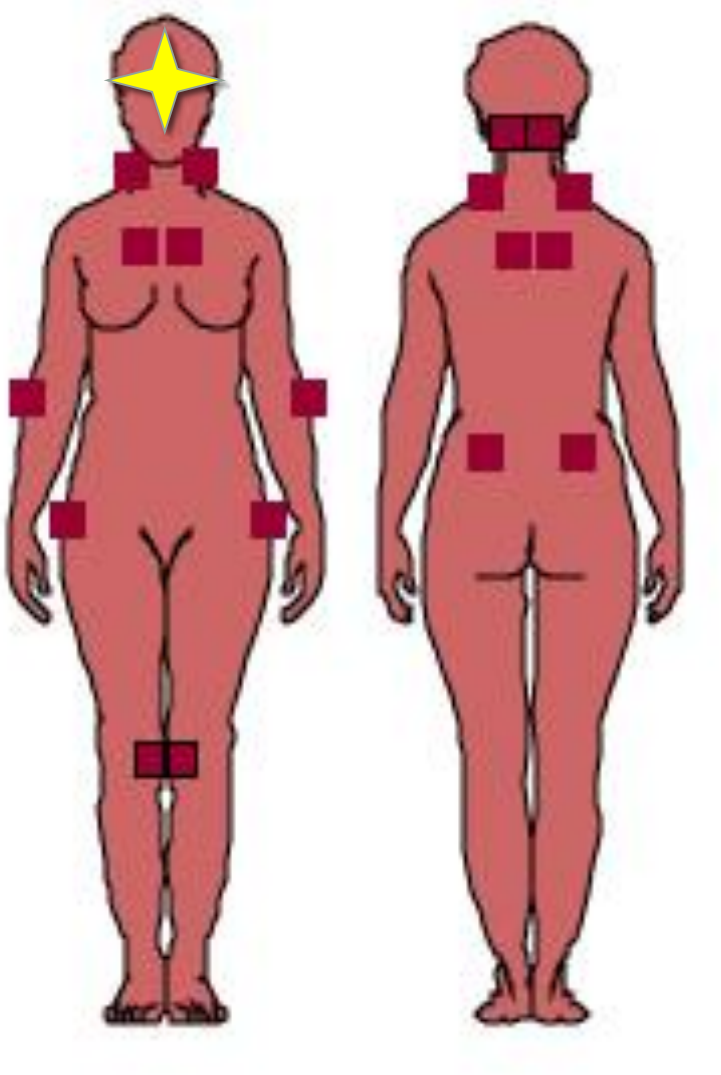
Canfield et al. *J Addict Med* 2010;4:108-113

5

73% came from Rx drugs!!!

Making the Diagnosis

To Count or Not to Count



- 1990 ACR Criteria 85% sensitivity
  - Used in most FM trials
  - Widespread pain above/ below, R/L sid
  - 11 of 18 tender points
  - 4 kg force- blanch fingernail
- Too subjective
- 25% FM did not meet criteria

Tender points are NOT Trigger Points!

Be sure to check control… forehead,

History of Diagnostic Criteria:

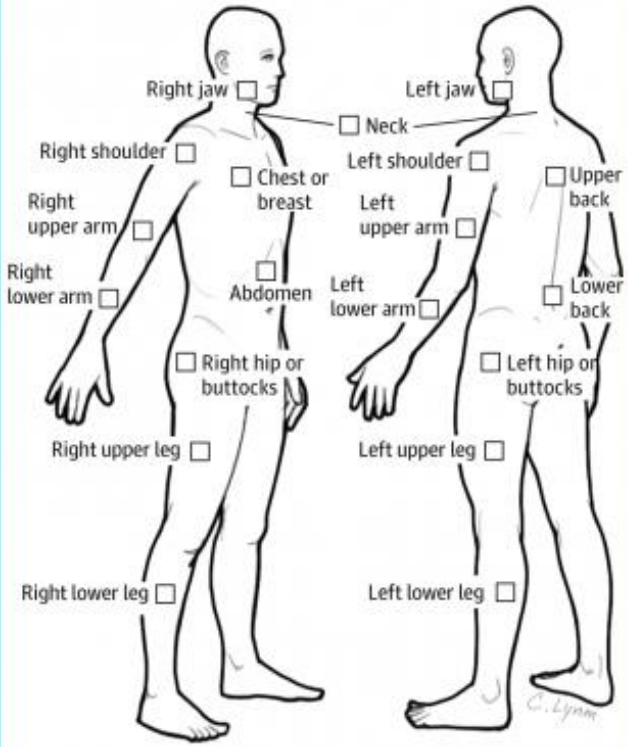
- 1990 ACR Criteria: 85% sensitivity & 90% specificity
  - The **tender point exam 11/18 required**
  - Specificity of criteria was near perfect and considered “Gold Standard”
  - 25% patients were missed
- 2010 ACR Criteria: eliminated tender point exam but requires examiner
  - Widespread Pain Index
  - Symptom Severity Score- if your SS was high enough you could have regional pain and still +
- 2011 Modified 2010 ACR Criteria- eliminated the examiner
  - Questionnaire
  - Fibromyalgia Symptom Scale
  - Severity: “Fibromyalgianess”
  - Score: 0-31 (combination of WPI & SS)
  - > 13 sensitivity 96% and specificity of 91.8%
- 2016 Revisions to modified 2010/2011
  - Complete self report
  - Generalized pain defined as pain in 4 out of 5 regions
  - Dx of FM is valid irrespective of other: Primary vs. Secondary

Wolfe, F., et al. (2016). 2016 Revisions to the 2010/2011 FM dx criteria. Seminars in Arthritis & Rheum; 46: 319-329.

FM= WPI > 7 & SS > 5 or WPI 3-6 & SS > 9

Widespread Pain Index
(1 point per check box; score range: 0-19 points)

(1) Please indicate if you have had pain or tenderness **during the past 7 days** in the areas shown below.
Check the boxes in the diagram for each area in which you have had pain or tenderness.



Symptom Severity
(score range: 0-12 points)

(2) For each symptom listed below, use the following scale to indicate the severity of the symptom **during the past 7 days**.

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

	No problem	Slight or mild problem	Moderate problem	Severe problem
Points	0	1	2	3
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?

	Points	0	1
A. Pain or cramps in lower abdomen		☐ No	☐ Yes
B. Depression		☐ No	☐ Yes
C. Headache		☐ No	☐ Yes

Additional criteria (no score)

(4) Have the symptoms in questions 2 and 3 and widespread 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

Total Score 0-31 > **12 = Fibromyalgia and KEY impact outcomes**

2016 Revisions to 2010/2011 FM Diagnostic Criteria

F. Wolfe et al. (2016) Seminars in Arthritis and Rheumatism 46: 319–329

Challenges:

- *Conceptual change from primary pain condition to multisystem syndrome*
- *Understand that "Fibromyalgianess" will impact outcomes*
- *Should be measured on all chronic pain patients… determines outcomes!*

Polysymptomatic Distress Scale (PSD) =
Fibromyalgia Symptom Questionnaire (FSQ)
"Fibromyalgianess"
Score 12-13

Is FIBROMYALGIA real?

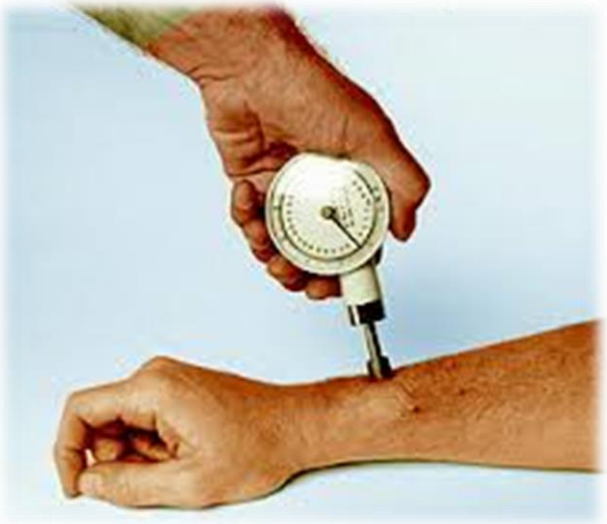
Cynthia Yolland
Queen Creek, AZ “Todays Forecast”

“This is an expression of the two worlds that is pain, especially in hidden syndromes and chronic pain. There is the outer world that is normal. “You look wonderful”. Then the turmoil that is going on inside. I wanted to take the pain out of the hidden box and shake it, then show it to my doctors, and my family,and friends.
In fact, a copy of this picture is part of my medical records.”

Pathophysiology

Is Fibromyalgia Real? Yes…

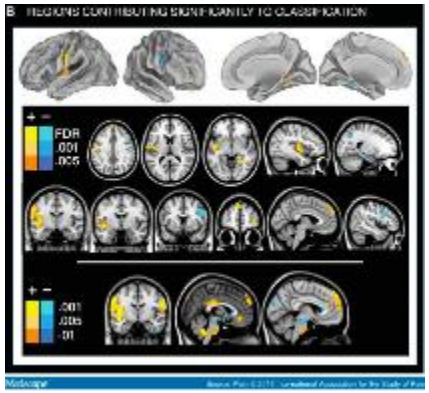
- Prototypical Central Amplification/ Sensitization
- Hyperalgesia
- Volume turned up way too high!
  - More sensitive to stimulation
  - Exaggerated response to that stimulation
  - Inability to modulate the pain



Here's why…

Pathophysiology:

- Work of… seminal papers
  - Functional MRI's
  - Pain threshold
  - Central Sensitization & Pain Amplification
- Altered pain processing peripherally and centrally contribute to central amplification **facilitation** and dampened effect **inhibitory** mechanisms
  - Bidirectional neural signals:
    - Pain & Mood
    - Pain & Sleep
  - **Failure of endogenous opiate systems**



Is Fibromyalgia real?

No longer a debate

How Do We Know That the Pain in Fibromyalgia Is "Real"?

Richard E. Harris, PhD, and Daniel J. Clauw, MD

Fibromyalgia is a common idiopathic pain condition often resulting in increased morbidity and disability in patients. The lack of peripheral abnormalities in this disease has led clinicians and researchers alike to question if this syndrome represents a valid entity. Recent genetic findings suggest that specific gene mutations may predispose individuals to develop fibromyalgia. In addition, neurobiological studies indicate that fibromyalgia patients have abnormalities within central brain structures that normally encode pain sensations in healthy pain-free controls. Future studies that focus on central neurobiological and/or genetic influences in fibromyalgia may bring insight into mechanisms of this problematic disease and ultimately result in improved treatments.

Introduction

Fibromyalgia is a common systemic disorder estimated to affect 2% to 4% of the population, second in prevalence among rheumatologic conditions to osteoarthritis [1]. There are legitimate controversies surrounding many aspects of fibromyalgia, including precisely how it should be defined, as well as whether individuals with this condition are disabled or deserve compensation [2]. However, at the same time, there have been rapid advances in our aggregate scientific knowledge about fibromyalgia. There are now multiple, converging lines of evidence confirming that the pain of fibromyalgia is "real" and that there are strong neurobiological underpinnings to this condition [3]. In fact, there has been a parallel recognition that many pain syndromes classically thought to be "idiopathic," such as irritable bowel syndrome, tension headache, temporomandibular syndrome, and idiopathic low back pain, share overlapping symptom expression and underlying mechanisms with fibromyalgia [4–6].

The American College of Rheumatology Criteria for Fibromyalgia: The Good and the Bad

In 1990, the American College of Rheumatology (ACR) established classification criteria for fibromyalgia [7]. These criteria require that an individual must have both chronic widespread pain involving all four quadrants of the body as well as the axial skeleton, and the presence of 11 of 18 tender points on examination. Two positive aspects of the ACR criteria are that 1) as intended, these allowed investigators throughout the world to use a single set of classification criteria to standardize research studies; and 2) these criteria require that individuals display widespread tenderness in addition to pain. In fact, many of the mechanistic and physiological studies of fibromyalgia have explored the underlying mechanism(s) for this tenderness (see following text). However, the ACR criteria have not been as uniformly positive in the societal sense. Two of the (unintended) consequences of these criteria are that they 1) are often used in clinical practice to diagnose individual patients in clinical settings (this was not the intended purpose and should not be rigidly adhered to); and 2) skew the diagnosis of fibromyalgia primarily toward women with high levels of distress (by assessing tenderness by "counting tender points").

The Problems with Tender Points

When the ACR criteria were published, it was thought that tender points were somehow areas that were increasingly tender in individuals with fibromyalgia, and many therapies were even specifically aimed at reducing tender points (eg, injections with anesthetics or corticosteroids). Since then, research has definitively shown that patients with fibromyalgia have tenderness or decreased pain thresholds extending throughout their body, and not only at localized areas considered tender points [8,9]. Thus, we now know that tender points are merely areas where anyone is more tender and that overall tenderness in an individual can be successfully predicted by just assessing

Signature for Fibromyalgia

TIMELINE:

1858

- Florence Nightingale…Described FM sx - Died at age 90

1904

- Gower first description in medicine
- Fibrositis

Early 1975-1980s

- Symthe & Yunus modern Fibromyalgia
- First clinical trials: FM vs HC
- Moldofsky- SLEEP disordered sleep and increased PAIN

Disordered Sleep: Non restorative sleep and Chronic Fatigue

- Lower sleep quality: alpha intrusions and less slow wave deep sleep
- Lower efficiency, fragmented
- Diagnostic criteria for FM with worse sleep associated w/ increased symptoms
- Restorative sleep, decrease WPS

• *Moldofsky, H., Scarisbrick, P., & Smythe, H. (1975). MSK sx and Non-REM sleep disturbance …Psychosomatic Medicine; July/ August.*
• *Wu, Y.L., et al. (2017). Sleep disturbances in fibromyalgia: A meta-analysis . J Psychosomatic Res; 96: 89-97.*
• *Yunus, M., et al. (1981). Primary fibromyalgia (fibrositis). Clinical study of 50 patients with matched normal controls. Seminars in Arthritis & Rheum; 11(1): 151-171*

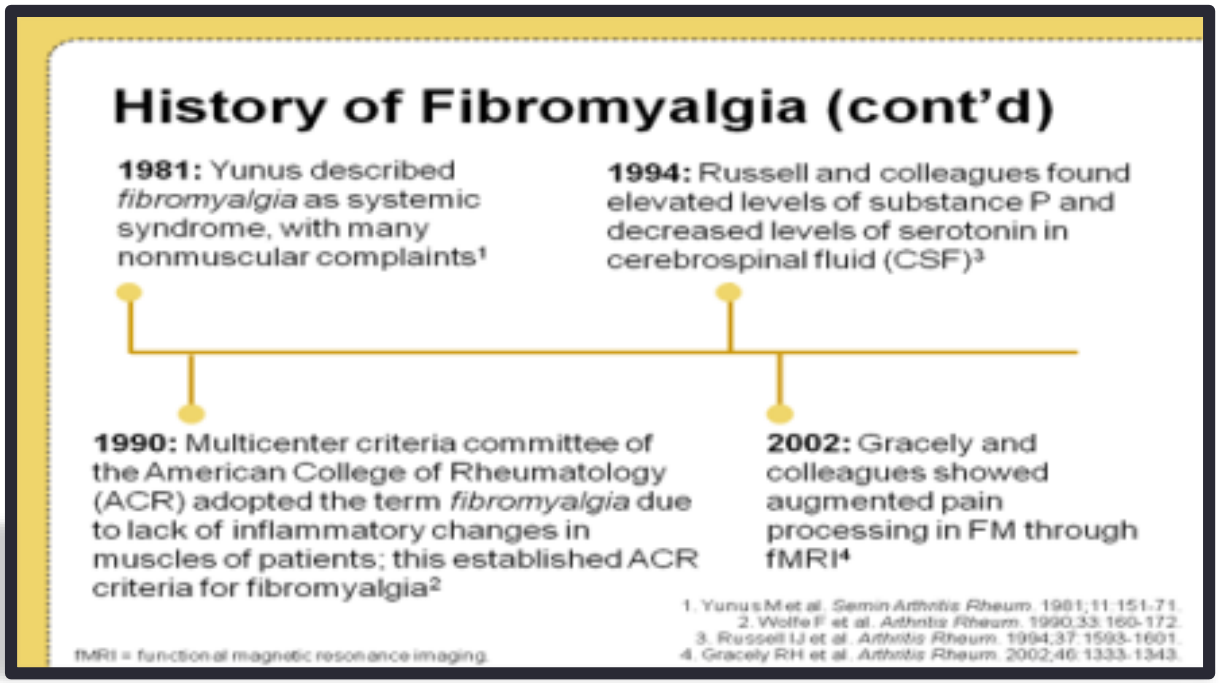
History of Fibromyalgia

History of Fibromyalgia

1990

ACR Criteria for FM

- Tender Point Count
  11/18 > 3m
- Clinical trials



1990-2010

- Substance P 3 x higher PAIN
- Serotonin, Norepi, Dopa lower
- Endogenous opioids higher
- Gaba low, glutamate high
- NGF higher PAIN

(see reference list for details)

fMRI- Fibromyalgia Signature

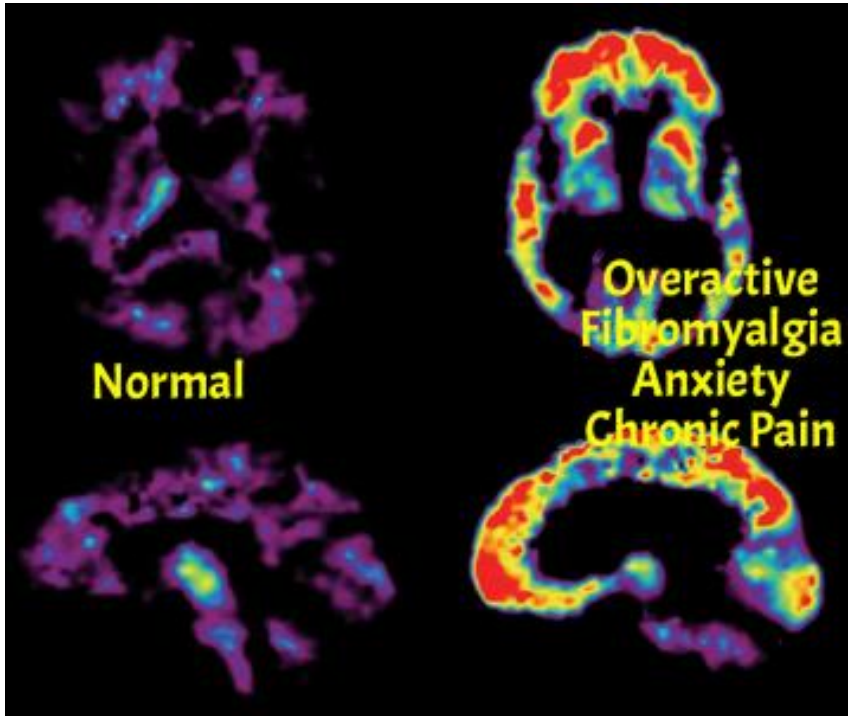
- **2002-** Gracely & Clauw fMRI
  - AC&R: 835-843 **(N=16 FM vs. 16 matched)**
- **2016-** Shi, H., et al.
  - Sem Arthritis & Rheum; 46: 330-337.Meta Analysis
- **2017-** Lopez et al.
  - Pain; 158(1): 34-47**. (N=40 vs. 40 matched)**

Fibromyalgia Signature

ARTHRITIS & RHEUMATISM

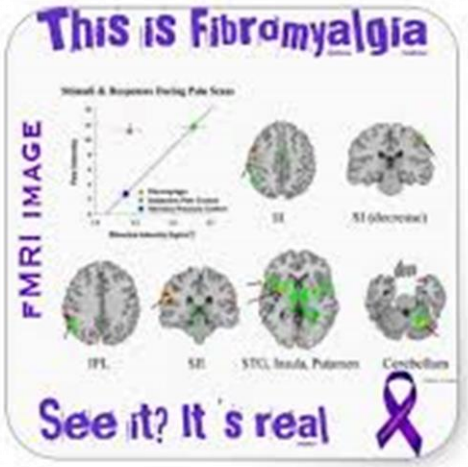
Functional Magnetic Resonance Imaging Evidence of Augmented Pain Processing in Fibromyalgia

Richard H. Gracely,[1] Frank Petzke,[2] Julie M. Wolf,[3] and Daniel J. Clauw[2]



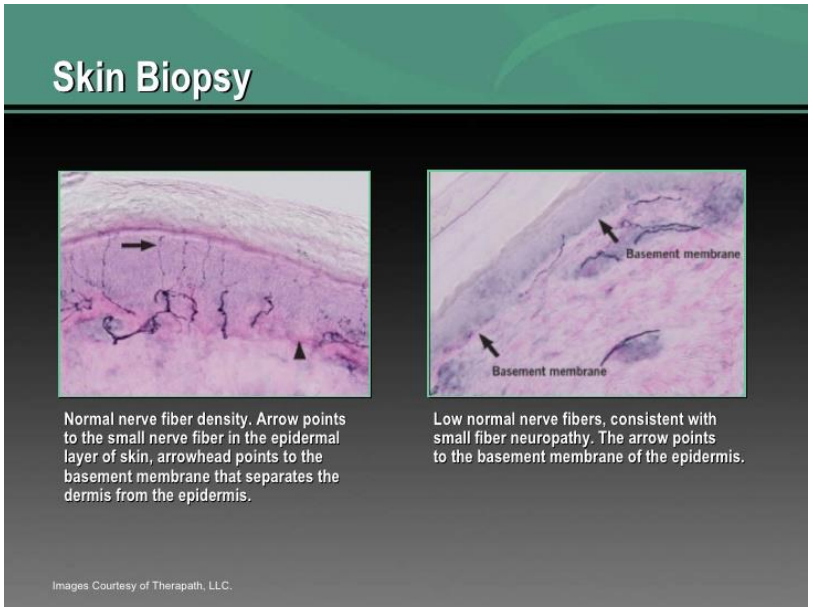
- f MRI findings:
  - Central Sensitization now referred to as AMPLIFICATION- occurs in **MOST CHRONIC PAIN STATES**-
- Functional MRI:
  - Noted altered activity in areas brain responsible for pain
  - Now evidence of “FM” signature
  - Studies suggest changes in brain activity following CBT for Depression/ Pain.
    - *deCharms, C., et al. (2005). Control over brain activation and pain learned by using real-time functional MRI. PNAS; 102(51). 18626-18631.*

Signature for Fibromyalgia



Functional MRI’s Evidence

TIMELINE:



2004

- Arnold et al. Genetic basis confirmed

2013

- Uceyler et al. SFN prevalent up to 60%

2015- 2018

- Brummet et al. (2015) **"Fibromyalgianess"** > 13 FSQ

Others:

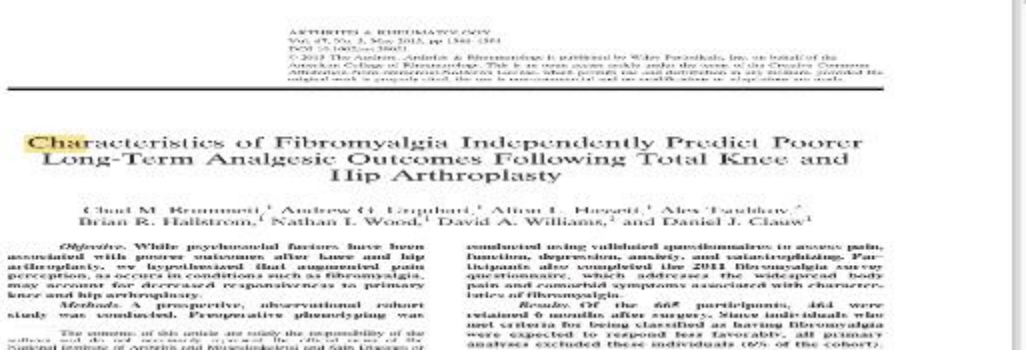
- *Janda, et al. (2015). FM survey criteria are associated with increased postoperative opioid consumption in women undergoing hysterectomy. Anesthesiology; 122: 1103-11.*
- *Ablin et.al. (2017). Effect of FM symptoms on outcomes of spinal surgery. Pain Medicine; 18: 773-380*
- *Kurien, et al. (2018). Preoperative neuropathic pain-like symptoms and central pain mechanisms in knee OA predicts poor outcomes 6 m after TKR surgery. The J of Pain; 19 (11): 1329-1341.*

Consider calculating this score when determining outcomes in all conditions…

"Fibromyalgianess"

- Large prospective observational study followed x 6 months postop N= 464
- Effects outcomes…
- Higher FS was predictive of less improvement in pain postop
- For every 1 degree in FSS, 9 mg increase in MSO4 equivalent
- 6 months after surgery determinant improvement in pain

Brummett, C., et al. (2015). Outcomes following TKR & THR. Arthritis & Rheum; 67(5): 1386



Characteristics of Fibromyalgia Independently Predict Poorer Long-Term Analgesic Outcomes Following Total Knee and Hip Arthroplasty

Pathogenesis- Summary

- Pain **CATASTROPHIZING**, or characterizations of pain as awful, horrible, unbearable, is increasingly being recognized as an important factor in the experience of pain.

- Endorphin receptors Mech dysfunction- reason for failure to respond to opiates… Should NOT be used
  - Endogenous opioid levels are elevated
  - Opioid receptor binding is diminished as seen in depression and anxiety**

Summary:

Mechanisms of Amplified Pain

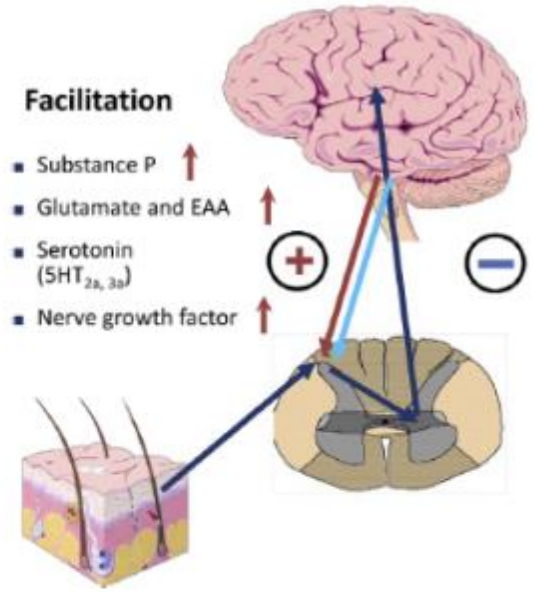


Fig. 3. CNS influences on pain and sensory processing.

endogenous opioid system. Both CSF levels and brain activity by functional neuroimaging appear to be augmented, not reduced (as would be necessary to *cause* augmented pain processing), in FM, which may be the reason why opioidergic drugs do not work well to treat FM and related pain syndromes [60,61].

Potential role of peripheral factors in centralized pain states

Aberrant brain Transmission is the Hallmark of FM

What causes it?

- Non Modifiable Causes:
  - Trauma: physical or emotional/psychological often – sexual/ abuse
  - Illness: viral infections, lyme or EBV, Hep C
  - Genetic predisposition becoming more clear, but also learned: 50%

- Modifiable Causes:
  - STRESS, chronic #1
  - Sleep deprivation
  - Mood: anxiety & depression
  - Obesity!!!
  - Personality characteristics, coping mechanisms-

Arnold, L., et al. (2004). Arthritis & Rheum; 50(3): 944-952
Clauw, D. (2015) Best Practice & Research Clinical Rheumatology; 29(1): 6-19.
Nakamura, I., et al. (2014). Artiritis & Rheum; 66(7): 1093

Pain Prone Phenotype:

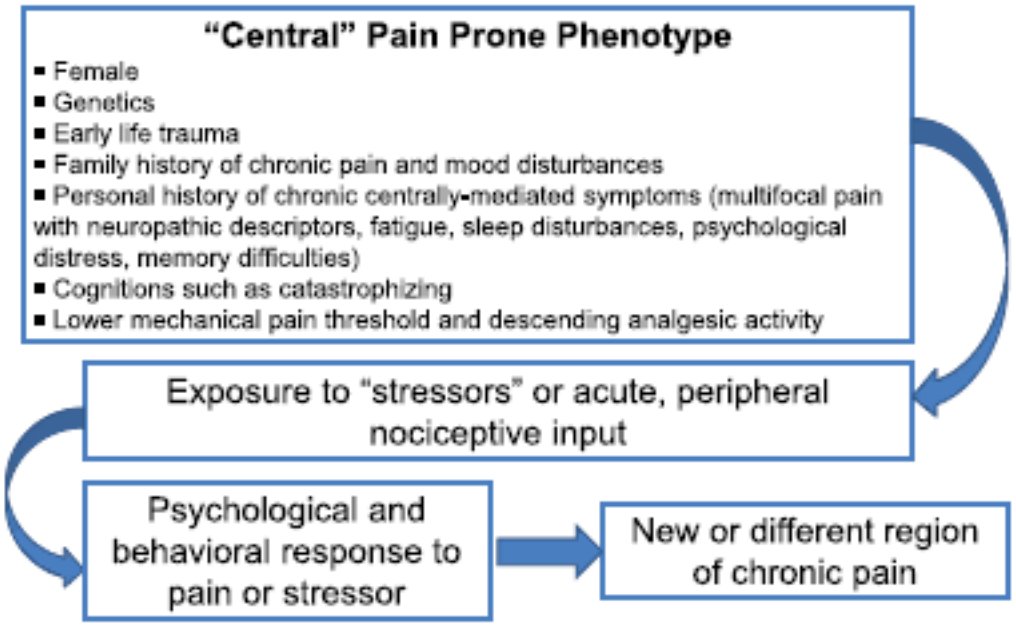


Fig. 2. Pain-prone phenotype.

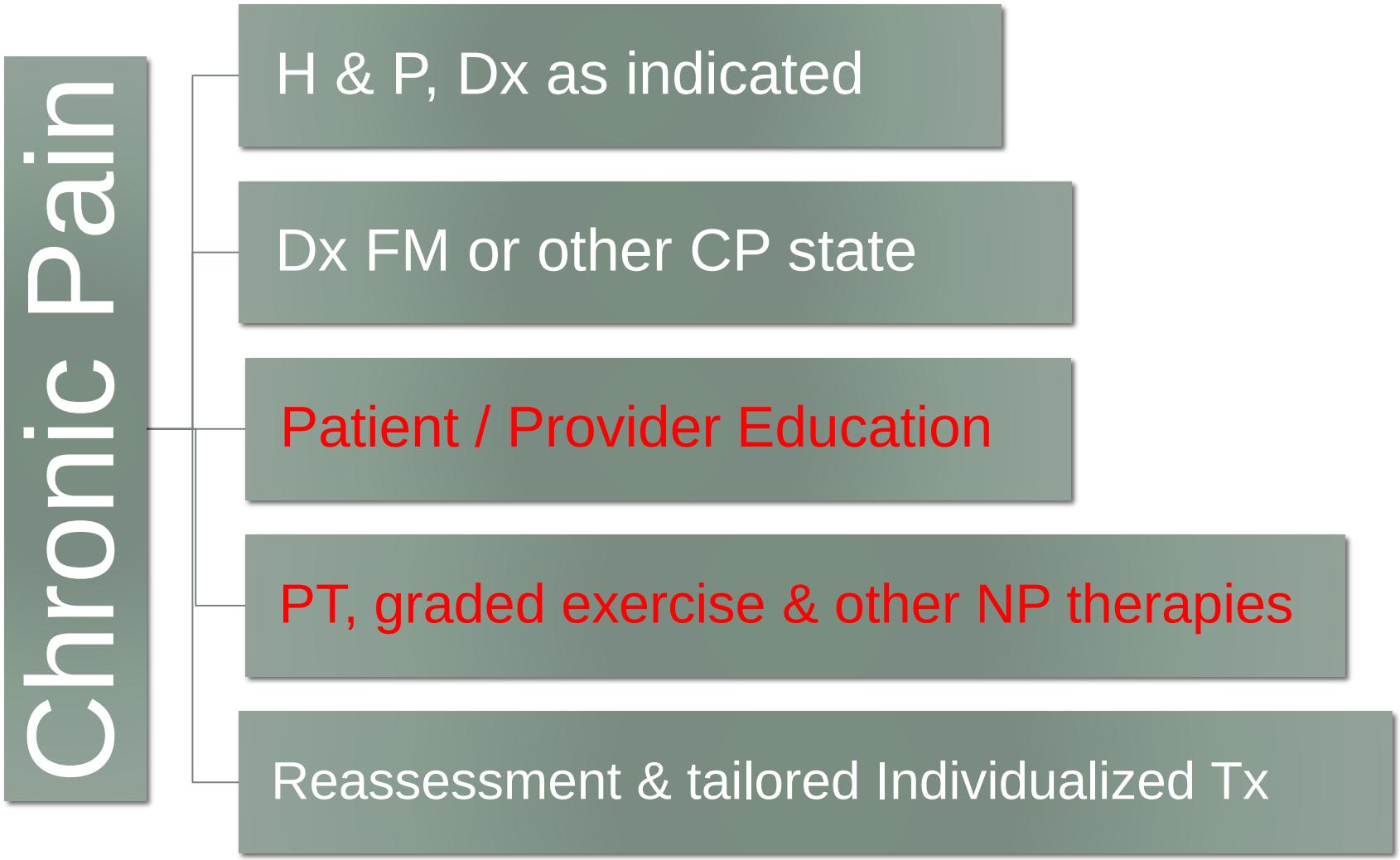
Clauw, D. (2015). Dx and treating chronic musculoskeletal pain based on mechanisms. Best Practice & Research Clinical Rheumatology; 29(1): 6-19.

Diagnostic Studies

Standardize Care:

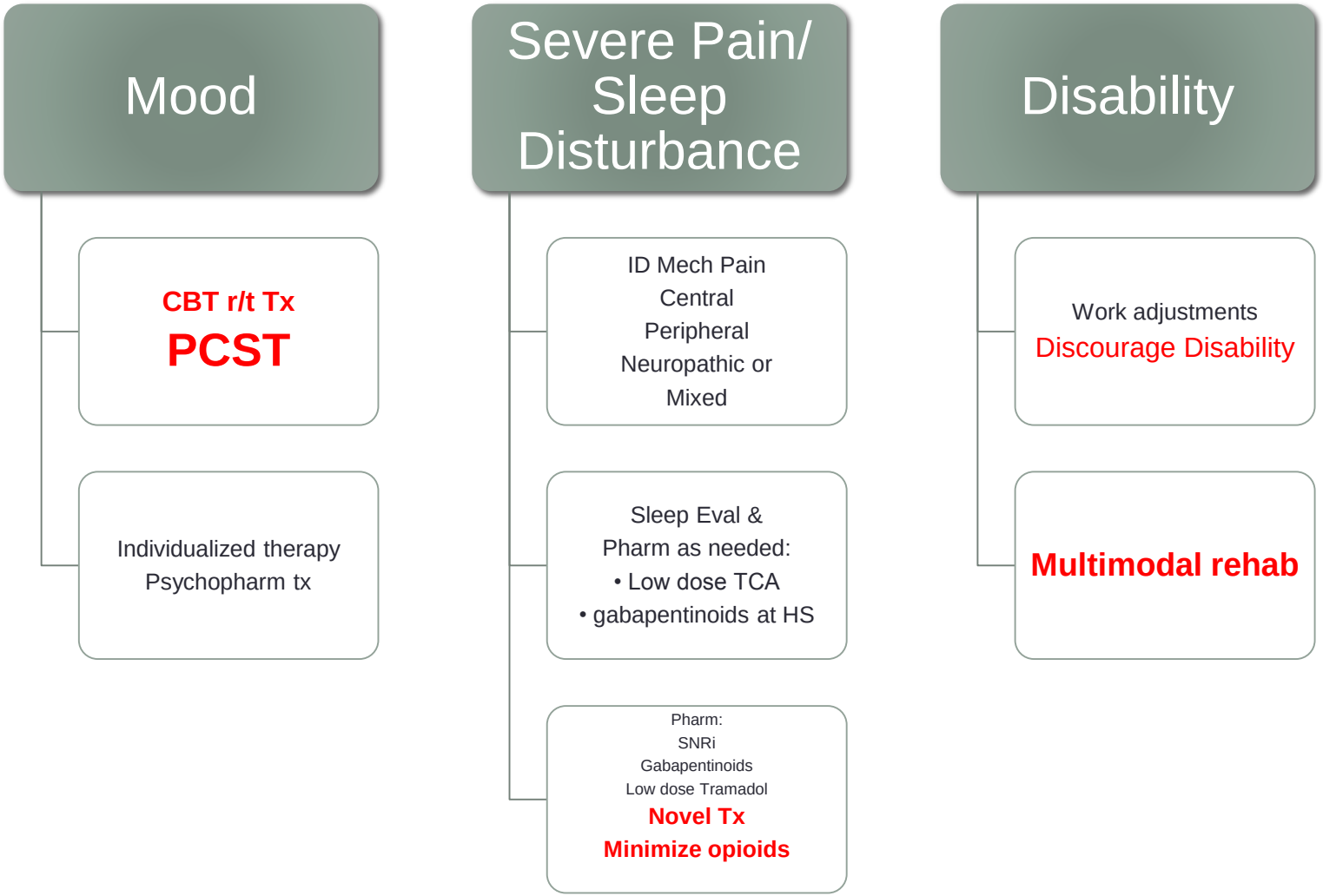
- Should avoid expensive dx studies
  - CBC & CMP
  - ESR
  - CRP
  - TSH
  - CPK
  - All other studies should be driven by specifics
    - No evidence viral or other infectious cause
    - Vit D: not directly r/t but levels < 20, many chronic pain low D
    - ANA only with direction
  - Sleep study when necessary
  - Psychiatric screening: anxiety & depression

Guidelines for FM and Chronic Pain



- *Macfarlane, G.J., et al. (2017). EULAR revised recommendations for the management of FM. Ann Rheum Dis; 76: 318-328.*
- *Tick, H., et al. (2017). A consortium pain task force white paper. www.nonpharmpaincare.org.*
- *https://www.cdc.gov/drugoverdose/prevention/index.html*

Guidelines for FM and Chronic Pain



- *Macfarlane, G.J., et al. (2017). EULAR revised recommendations for the management of FM. Ann Rheum Dis; 76: 318-328.*
- *Tick, H., et al. (2017). A consortium pain task force white paper.* www.nonpharmpaincare.org

Basic Tenements:

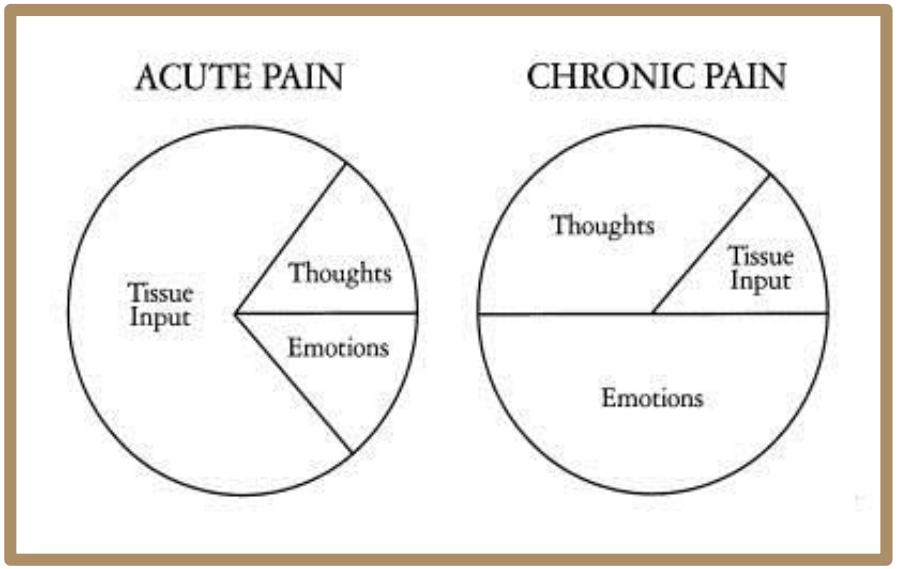
Fibromyalgia is a Disorder (constellation of symptoms) not a Disease

1. Symptoms are not caused by an organic disease
2. It is a legitimate condition
3. Symptoms are persistent in nearly all patients often turned on or worsened
    - Psychological stress
    - Emotional conflict
4. Total relief of symptoms is seldom achieved: **No magic pill!**
5. The symptoms do not lead to disability and **DO NOT** shorten life expectancy
6. Most patients learn to adapt to the symptoms over time
7. Self management strategies to modulate symptoms should be emphasized
8. Goals of treatment are:
    - Improvement in quality of life
    - Maintenance of function in everyday life
    - Reduction of symptom burden

Treatment of FM: Education is KEY

Understanding Pain: Patient Teaching

Acute pain **NOT** effectively treated- leads to CPS



This is how I explain it to patients…

Persistent Pain

> 3 mnths

Is

Chronic Pain

- Make the Diagnosis
  - **Education at diagnosis sets expectations**
  - Identify resources
- Evaluate for co morbid conditions
  - Identify any underlying condition: SS, PsA
  - Sleep disorders
  - Identify other co morbid pain conditions
    - IBS; Migraines/ HA; IC/ chronic prostatitis; TMJ; LBP/ neck pain/ myofascial pain; chronic pelvic pain;
  - Evaluate for depression, anxiety, other co morbid psychiatric issues: PHQ, GAD-7
  - Social stressors
    - Family
    - Work/ leisure activity
  - Obesity
  - Physical strengthening: Strongest evidence
- Other Non Pharmacologic strategies
  - CBT vs. CST: in person vs. online support- using www.FibroGuide.com or www.Knowfibro.com
  - Positive Affective interventions: Teach Happiness
  - Complementary and Alternative Treatments: acupuncture
- Pharmacotherapy to control pain: weak evidence at best

Standardize Care

Macfarlane et al. (2016). EULAR recommendations FM. Ann Rheum Dis; 0: 1-11. doi:10.1136/annrheumdis-2016-209724

Physical Strengthening

- Start somewhere:
  - 50% of what you think you can do and slowly increase
- Physical therapy:
  - Cardio
  - Tai Chi…

Self Management Strategies:

Response to CBT… change in sensitivity

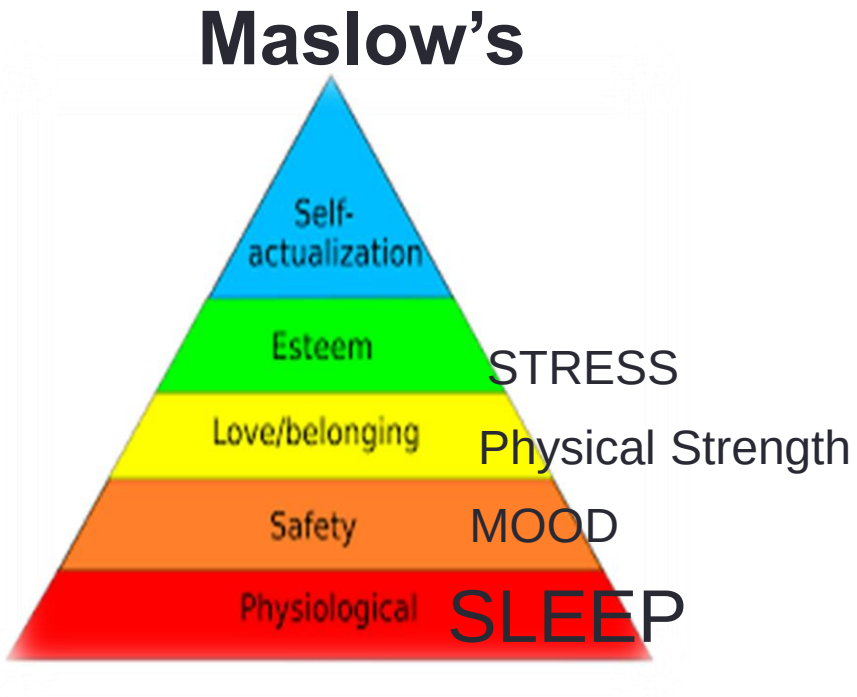
- • *Ang et al. (2010). AC & R; 62(5): 618-23.*
- ***(N=17 FM vs. 16 UC 6 wk telephone CST)***

- • *Emery, C.F. et al. (2006). J Pain Symp Mngmt; 31(3): 262-269.*
- ***(N=65 for 45 mins CST- telephone)***

- *Dear, et. al. (2018). J of Pain; 19(12): 1491-1503.*
- *12-24 month f/u Internet CBT based program*
- *N=490 into 4 groups varying amounts clinician time*
  - ***(n= 143 regular, n=141 optional contact, n= 131, n= 75 waitlist)***

What's the Evidence?

- If you don't address SLEEP and PSYCH, **NOTHING** you do will work!
- Behavioral strategies first…
- Pharmacotherapy when necessary:
  - Address sleep
  - Mood
  - Modify Central Pain processing



Standard of care: Treatment

Understanding Sleep…

ASSESS SLEEP:

Describe the problem…

- Sleep: trouble falling, staying and/or Non restorative
  - What is INSOMNIA?
- Daytime fatigue
- This will determine next step: what is interfering w/ sleep
  - Pain
  - Anxiety
  - Behavioral issues
  - OSA: snoring, apneic episodes (incidence)
    - Disrupted sleep as a component of FM (scientific evidence)
    - Contributing to chronic fatigue and widespread pain
- Sleep study when necessary…
- Caution medications can impair sleep…

Sleep

Address the problem…

Sleep: Do's & Don'ts

- Dark, cool, quiet room
- **No screen time 30-45 mins, if reading w/ electronic device- night mode- melatonin**
- **Bed is for sex and sleep only**
- Routine night time ritual – same time going & waking up
- Minimize distractions at night…
- Balance activity and rest throughout the day., every day
- No heavy exercise, food, ETOH, stress, smoking before bed… allow for transition
- **Get out of bed if not asleep after 20 minutes; something calm 30 minutes, then try again**
- Don't go to bed if not drowsy.
- **Naps: and not after 3:00 p.m or longer than 45-60 mins**
- Caution: antihistamines/ hypnotics to help with sleep, poor quality.
- **Don't let children or pets interfere with your sleep.**

Targeted Therapies: Neurochemical

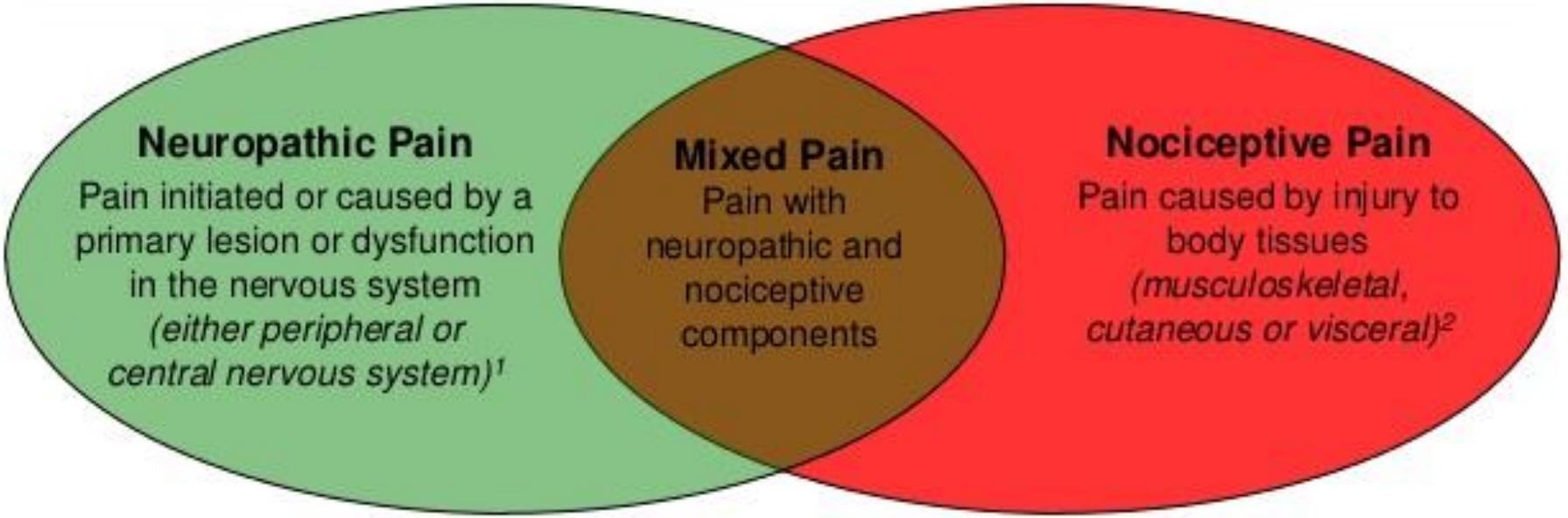
- Treat Sleep disorder
- Address Mood disorders…
- Avoid Opioids: High levels of endogenous opioids in CSF
  - Down regulation of opiate mu receptors
    - High risk for failure
    - Misuse and abuse
    - Potentiating hyperalgesia…
- Increase Serotonin, Norepi and Dopa
- Block substance P
- Increase Gaba & decrease glutamate
- Block NGF

• *KEY RESOURCES:*
• *Atzeni, F. (2019). Review: One year in review 2019: Fibromyalgia. Clin & Exp Rheum; 37 (Suppl. 116): S3-S10. **
• Clauw, D. (2015). Diagnosing and treating chronic musculoskeletal pain based on mechanisms. Best Practice & Research Clinical Rheumatology; 29(1): 6-19.
• Fitzcharles, M.A. (2013). 2012 Canadian guidelines Pain Res Manag; 18(3): 119-126.
• Hauser, W., & Fitzcharles, M. (2019). Facts and myths pertaining to fibromyalgia. Dialogues Clin Neurosci; 20(1): 53–56.
• Macfarlane GJ et al. (2016). EULAR revised recommendations for the management of fibromyalgia. Ann Rheum Dis; 0: 1-11. doi:10.1136/annrheumdis-2016-209724

Drug Therapies:

- Optional NOT Obligatory
- No 2 people are the same…
- Should be targeted to the underlying process: Essential
  - Sleep: need to clarify the issue…
  - Mood
  - GI/ GU issues
- Pain modulation

Presentation Across Pain States Varies



Examples
- Postherpetic neuralgia
- Trigeminal neuralgia
- Painful diabetic neuropathy
- Postsurgical neuropathic pain
- Posttraumatic neuropathy
- Central poststroke pain

Common descriptors[2]
- Burning
- Tingling
- Hypersensitivity to touch or cold

Examples
- Low back pain with radiculopathy
- Cervical radiculopathy
- Cancer pain
- Carpal tunnel syndrome

Examples
- Pain due to inflammation
- Limb pain after a fracture
- Joint pain in osteoarthritis
- Postoperative visceral pain

Common descriptors[2]
- Aching
- Sharp
- Throbbing

1. International Association for the Study of Pain. IASP Pain Terminology;
2. Raja et al. in Wall PD, Melzack R (Eds). Textbook of Pain. 4th Ed. 1999;11-57.

Medications & SLEEP

- Benzodiazepines & ETOH
- Stimulants: caution
- Ambien, Lunesta…Gaba, benzo receptor
- Melatonin, Romelteon
- Marijuana: CBD vs THC
- Antidepressants
  - Amitriptyline,nortriptyline, trazodone
  - SSRI, SNRIs and NDRIs
- Muscle relaxants: several
  - Cyclobenzaprine: TCA properties
  - Tizanidine/ Baclofen: anti spastic agents
  - Carisprodol
- Psychotropic agents:
  - Quetiapine
  - Mirtazepine: TCA properties
- Gabapentinoids

- MEDICATIONS:
  - Alpha 2 delta ligands (anticonvulsants): excellent…
    - analgesic benefits through substance P reduction
    - anxiolytic centrally
    - Restores slow wave deep restorative sleep…
    - Mood stabilizer
    - Small fiber neuropathy

  - Gabapentin & Pregabalin … others available
    - Gabapetin does not require PA, gentle titration easy
    - Start slow… only at night initially for tolerance
    - Titrate to lowest effective dose as tolerated

Pharmacotherapy

Treatments to Consider:

-Rozerem or Melatonin/ Magnesium & Zinc

-TCA- Amitriptyline/ Tetracyclic- Trazodone- Na channel calms excitable nerves

-Muscle relaxants
    -Cyclobenzaprine: TCA properties

-antispastic agents
    - Tizanidine
    - Baclofen

-Seroquel (quetiapine): excellent for insomnia in low doses

-Anti depressants depend on the presentation
    Pain: SNRIs…Duloxetine & Milnacipran
    Anxiety/ and Older: Sertraline, citalopram
    Cognitive issues: Bupropion

Pharmacotherapy

- Analgesics:
  - **Heat & Ice**
  - APAP
  - NSAIDs * Lowest dose for shortest term* tx regional problems
    - Naproxen/ Celecoxib has safest CV profile
    - Ibuprofen/ Celebrex / meloxicam better GI tolerance
    - Should always be taken with GI protection
    - Topical vs oral
    - Precautions… requires careful monitoring & Education
  - Anticonvulsants: Gabapentin & Pregabalin
  - Anti depressants: what is the problem?

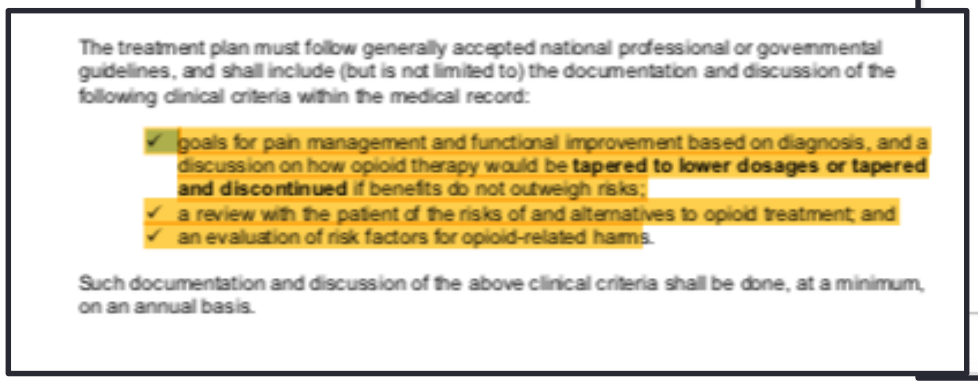
Controversial:

- LDN
- Marijuana
  - CBD
  - THC

Medications

Nissen, S., et al. (2016). Cardiovascular safety of celecoxib, naproxen, or ibuprofen for arthritis. NEJM; 375(26): 2519-2529.

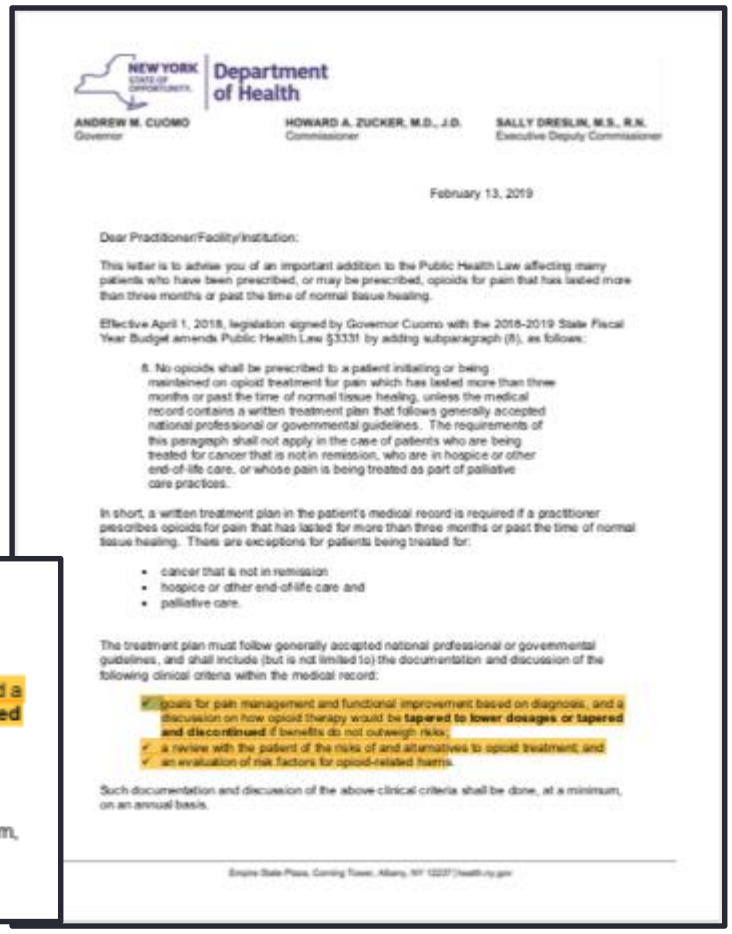
- Opioid Use:
  - Tramadol: mu and 5HT
  - BUT… NYS requires documentation
  - Lowest dose, shortest time
  - Risk assessment
  - Have an out
  - Measure function!



The treatment plan must follow generally accepted national professional or governmental guidelines, and shall include (but is not limited to) the documentation and discussion of the following clinical criteria within the medical record:

- ✓ goals for pain management and functional improvement based on diagnosis, and a discussion on how opioid therapy would be **tapered to lower dosages or tapered and discontinued** if benefits do not outweigh risks;
- ✓ a review with the patient of the risks of and alternatives to opioid treatment; and
- ✓ an evaluation of risk factors for opioid-related harms.

Such documentation and discussion of the above clinical criteria shall be done, at a minimum, on an annual basis.



NEW YORK STATE OF OPPORTUNITY. Department of Health

ANDREW M. CUOMO, Governor | HOWARD A. ZUCKER, M.D., J.D., Commissioner | SALLY DRESLIN, M.S., R.N., Executive Deputy Commissioner

February 13, 2019

Dear Practitioner/Facility/Institution:

This letter is to advise you of an important addition to the Public Health Law affecting many patients who have been prescribed, or may be prescribed, opioids for pain that has lasted more than three months or past the time of normal tissue healing.

Effective April 1, 2018, legislation signed by Governor Cuomo with the 2018-2019 State Fiscal Year Budget amends Public Health Law §3331 by adding subparagraph (ii), as follows:

ii. No opioids shall be prescribed to a patient initiating or being maintained on opioid treatment for pain which has lasted more than three months or past the time of normal tissue healing, unless the medical record contains a written treatment plan that follows generally accepted national professional or governmental guidelines. The requirements of this paragraph shall not apply in the case of patients who are being treated for cancer that is not in remission, who are in hospice or other end-of-life care, or whose pain is being treated as part of palliative care practices.

In short, a written treatment plan in the patient's medical record is required if a practitioner prescribes opioids for pain that has lasted for more than three months or past the time of normal tissue healing. There are exceptions for patients being treated for:

- cancer that is not in remission
- hospice or other end-of-life care and
- palliative care.

The treatment plan must follow generally accepted national professional or governmental guidelines, and shall include (but is not limited to) the documentation and discussion of the following clinical criteria within the medical record:

- ✓ goals for pain management and functional improvement based on diagnosis, and a discussion on how opioid therapy would be **tapered to lower dosages or tapered and discontinued** if benefits do not outweigh risks;
- ✓ a review with the patient of the risks of and alternatives to opioid treatment; and
- ✓ an evaluation of risk factors for opioid-related harms.

Such documentation and discussion of the above clinical criteria shall be done, at a minimum, on an annual basis.

Pharmacotherapy

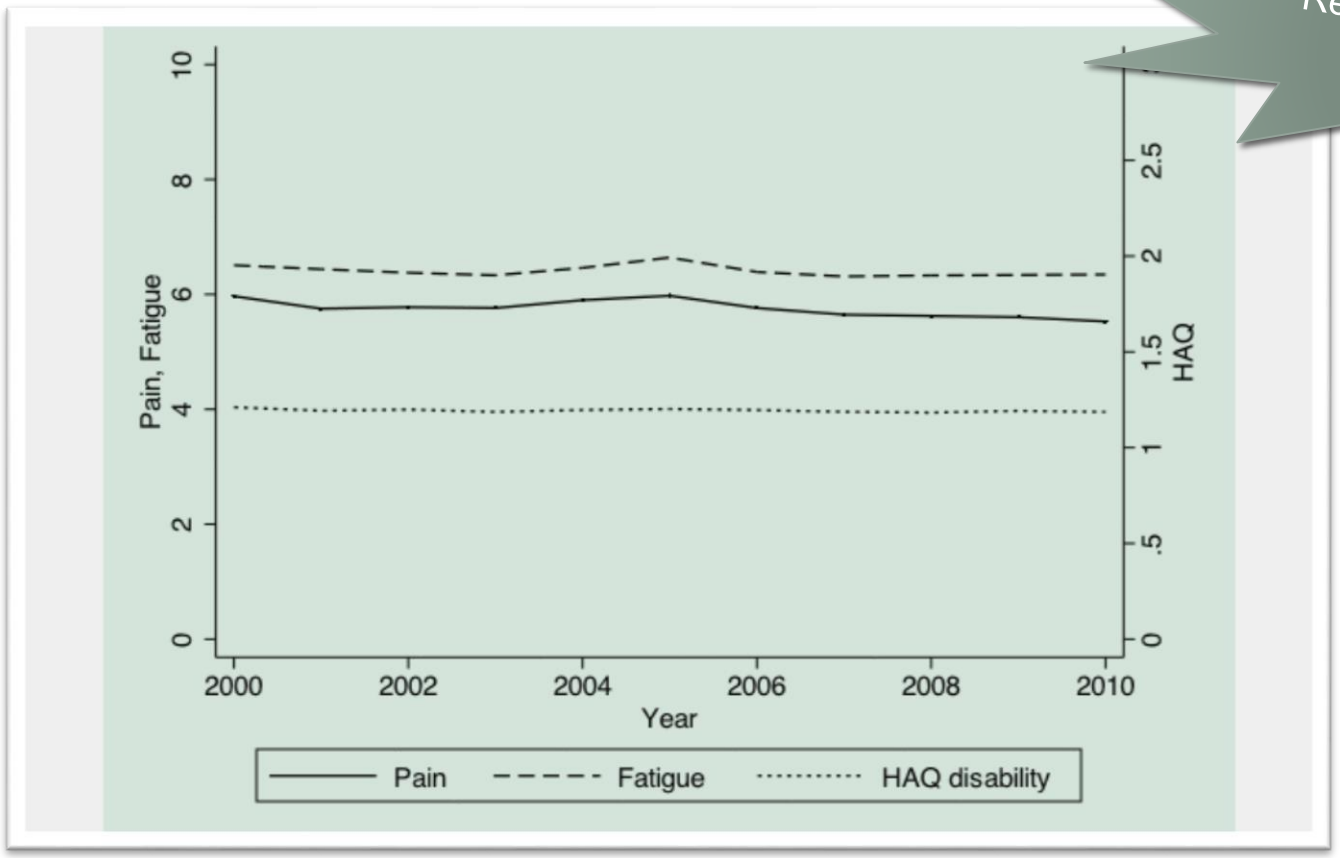
Risk Assessment prior to Opioid Rx…

Scoring (Risk)
0-3: low
4-7: moderate
≥ 8: High

Opioid Risk Tool

This tool should be administered to patients upon an initial visit prior to beginning opioid therapy for pain management. A score of 3 or lower indicates low risk for future opioid abuse, a score of 4 to 7 indicates moderate risk for opioid abuse, and a score of 8 or higher indicates a high risk for opioid abuse.

Mark each box that applies	Female	Male
Family history of substance abuse		
Alcohol	1	3
Illegal drugs	2	3
Rx drugs	4	4
Personal history of substance abuse		
Alcohol	3	3
Illegal drugs	4	4
Rx drugs	5	5
Age between 16—45 years	1	1
History of preadolescent sexual abuse	3	0
Psychological disease		
ADD, OCD, bipolar, schizophrenia	2	2
Depression	1	1
Scoring totals		



Remember- Opiates Don't work

N= 3,123 pts from 2000-2011 Longitudinal study w/ 19.201 self reported assessment
Wolfe et al (2011). European J Pain; 17: 581-586

Limitations of Medications…

Pharmacotherapy

- The Patients Role is Critical

Patient Materials

Living with Chronic Pain is….
like driving with a flat tire

Need all **4** tires to “move” smoothly…

1. Medical treatments

1. Physical Strength/ endurance

3. Social Support

4. Coping strategies:
   - Relaxation
   - Distractions
   - Pacing/ Pleasant activities
   - Cognitive restructuring
   - Problem Solving/ Goal Setting

Fill your tires with….

Adapted from Penney Cowen, founder American Chronic Pain Association.
www.theapca.org Wonderful patient centered resource!!

Realistic Expectations

Disability and Fibromyalgia

- Strong connection between work and HRQOL
  - Better overall function
  - HRQOL
  - Life satisfaction
- Applying for disability promotes “illness” behaviors
  - Difficulty controlling condition through this process
- Cross Sectional Internet Survey: **Need EARLY ID and Interventions**
- N= 198 (n=73 FT, n=29 PT, n=96 U)
  - Pain intensity: no difference
  - Functional disability & HRQOL : significant
  - Secondary health conditions
  - Depression: employed lowest
  - Social support: highest in employed
  - Life satisfaction: significant differences

Muller, V., et al. (2017). Association of employment and health and well-being in people with fibromyalgia. J Rehab; 83(3): 37-43.

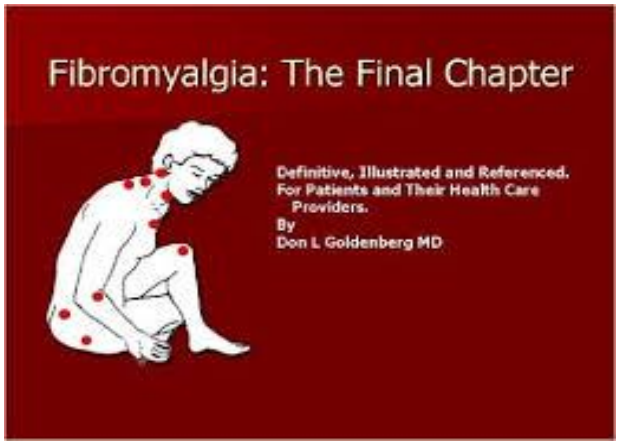
SHARED MEDICAL VISITS

Solutions for the Fibromyalgia Visit

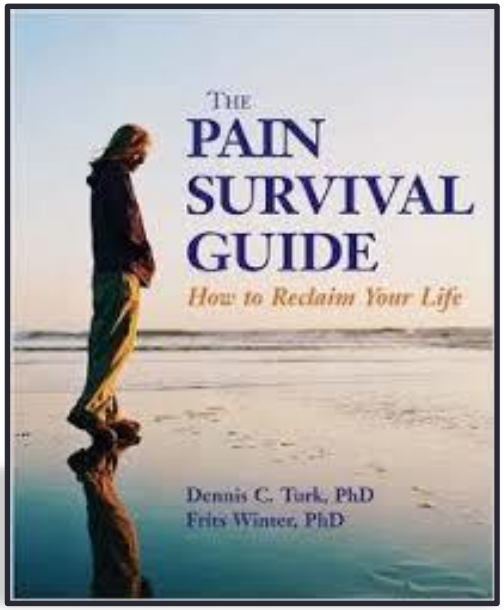
Tara Shuey "Fairyland of Pain"
From Painexhibit.org

- **1-2 x month**
- **Pre visit assessments**
- **H & P abbreviated to confirm dx**
- **Group educational session**
- **Support group**
- **Lecture Series**

- Self Management Skill: Running the car… COPING SKILLS
  - Pain Education: understanding mechanisms of control
  - Relaxation: PMR, mini sessions, guided imagery
  - Activity/ Pacing
    - Pleasant Activity scheduling “Homework- 40 Things”
    - Aerobic exercise critical
    - Stretching regimens
    - Learning to PACE activities: life in planned increments
  - Distraction techniques: learning how and when
  - Cognitive restructuring: more than just positive thinking
    - Problem solving
    - Recognizing and Challenging negative thinking patterns



- Resources:
  - Don Goldenberg: The Final Chapter
  - U Michigan’s fibroguide: http://fibroguide.med.umich.edu/



Standard of Care Treatment

Northwell Health

Fibromyalgia Wellness Center
Resources

Christine Stamatos DNP, ANP-C

Websites:
The Arthritis Foundation
www.arthritis.org
The American College of Rheumatology
www.rheumatology.org
The American Chronic Pain Association
www.theacpa.org
University of Michigan
www.fibroguide.com
Calm
www.calm.com
Headspace
www.headspace.com
Pain Online
http://www.painonline.org/
NIH
https://www.nih.gov/health-information
Dance Therapeutics
http://www.dancetherapeutics.com/

Podcasts:
The Nutrition Diva
The Savvy Psychologist

Books:
Don Goldenberg's eBook
Fibromyalgia: The Final Chapter
Dennis Turk & Fritz Winter's
Pain Survival Guide
Clair Davies & Amber Davies
The Trigger Point Therapy Workbook

S:
Calm
Headspace
Relaxation
Autogenic Tool
Heneify
Gratitude
Sleep cycle alarm clock
My fitness pal
ACPA pain log
Pain Diary

SM Tools:
Activity Tracking Devices
Shiatsu Heated, Kneading Massage
Massage stick
The Back Knobber

Other Modifiable Factors: Physical strength & Endurance

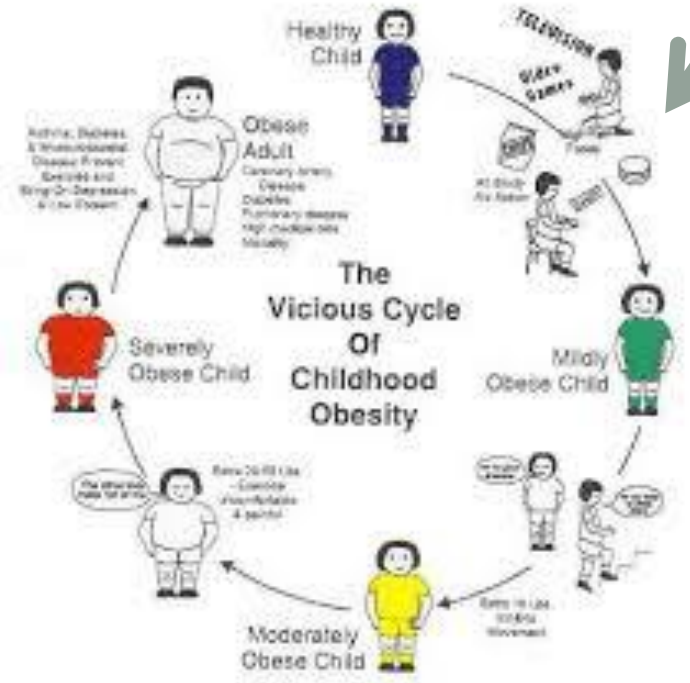
Fibromyalgia & Obesity, Is there a link?

Risk of Fibromyalgia in Obesity

Fatigue, Widespread Pain:

- low self esteem
- inactivity
- loss muscle mass
- increased joint pain
- Chronic pain is different…
- Inflammatory state
- Depression
- Sleep disturbance
- Metabolic syndrome
- Cardiovascular challenges
- Unwell state…and worse….

FIBROMYALGIA!

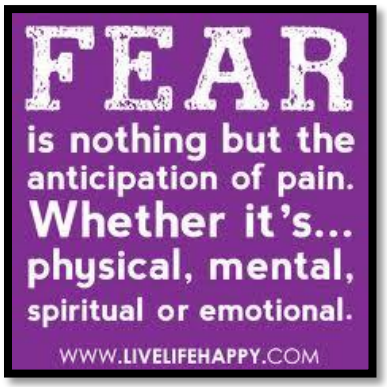


It starts early…

Realistic Expectations

- Important: How you THINK and FEEL dramatically impacts your pain.
- Stress/ Fatigue/ Anger/ Sadness/ GUILT
  - INCREASE PAIN!!!!!
- Good Sleep/ Laughter/ Happiness/ Relaxation
  - DECREASE PAIN!!!!!
- You have SOME control.
- May not be able to change reason for the PAIN… can learn to change your response to the pain.
- Acceptance: not give up… don't stop fighting... **JUST TAKE THE LEAD!**

Realistic Expectations



BREAKING THE CYCLE…

Kinesiophobia

Brief Action Planning Provider…. 5 A's

1. **A**ssess- factors affecting health
2. **A**dvise- gives personalized, specific advice
3. **A**gree- collaboratively select
4. **A**ssist- provide assistance where necessary
5. **A**rrange- arrange follow up

Realistic Expectations: Goal Setting

References

- Ang,D., et al. (2010). CBT attenuates nocioceptive responding in patients with fibromyalgia: A pilot study. Arthritis Care & Research; 62(5): 618-623.
- Arnold, L., et al. (2004). Family study of FM. Arthritis & Rheum; 50(3): 944-952.
- Atzeni, F. (2019). Review: One year in review 2019: Fibromyalgia. Clin & Exp Rheum; 37 (Suppl. 116): S3-S10.
- Bennet, R., et al. (2007). An internet survey of 2,596 people with fibromyalgia. BMC Musculoskeletal Disord; 8: 27.
- Brummett, C., et al. (2015). Characteristics of FM independently predict poorer long-term analgesic outcomes following total knee and hip arthroplasty. Arthritis & Rheum; 67(5): 1386-1394.
- Cagnie, B., et al. (2014). Central sensitization in FM? A sysetmatic review on structural and functional brain MRI. Seminars in Arhtritis and Rheumatism; 44: 68-75.
- Certal, C., et al. (2018). The impact of sleep in fibromyalgia, an exploratory study. J Psych & Clin Psychiatry; 9(5): 456-459.
- Chandran, A., et al. (2012). The comparative economic burden of mild, moderate, and severe FM: Results from a retrospective chart review and cross-sectional survey of working age U.S. Adults. J Manag Care Pharm; 18(6): 415-26.
- Clauw, D. (2015). Diagnosing and treating chronic musculoskeletal pain based on mechanisms. Best Practice & Research Clinical Rheumatology; 29(1): 6-19.
- Clauw, D., Arnold L., & McCarberg, B. (2011). The science of fibromyalgia. Mayo Clin Proc; 86(9): 907-911.
- Dahlhamer, J., et al. (2018). Prevalence of chronic pain and high-impact chronic pain among adults- US, 2016. MMWR;67(36): 1001-1005.
- Dear, et. al. (2018). Trial of an internet-delivered pain Management program provided with different levels of clinician Support. J of Pain; 19(12): 1491-1503.
- *deCharms, C., et al. (2005). Control over brain activation and pain learned by using real-time functional MRI. PNAS; 102(51). 18626-18631.*
- Dowell, D., Haegerich, R., & Chou, R. (2016). CDC Guideline for prescribing opioids for chronic pain- United States, 2016. JAMA; 315(15): 1624-1645.

References

- Emery, C.F. et al. (2006). Effects of brief CST intervention in pts having OA knee pain. J Pain Symp Mngmt; 31(3): 262-269.
- Fitzcharles, M. A., Perrot, S., & Hauser, W. (2018). Comorbid fibromyalgia: A qualitative review of prevalence and importance. Eur J Pain; 22: 1565-1576.
- Fitzcharles, M.A. (2013). 2012 Canadian guidelines for the diagnosis and management of fibromyalgia syndrome: Executive summary. Pain Res Manag; 18(3): 119-126.
- Gracely, R., Petzke, F., Wolf, J., & Clauw, D. (2002). Functional magnetic resonance imaging evidence of augmented pain processing in FM. Arthritis & Rheumatism; 46(5): 1333-1343
- Guglielmo, D., et al. (2018). Symptoms of anxiety and depression among adults with arthritis- US, 2015-2017. MMWR; 67(39): 1081-1087.
- Harris, R., et al. (2007). Decreased central mu-Opiod receptor availability in FM. J Neuroscience; 27(37); 10000-10006.
- Harris, R. & Clauw, D. 2006. How do we know that the pain in fibromyalgia is real? Current Pain and Headache Reports; 10(6): 403-407.
- Hauser, W., & Fitzcharles, M. (2019). Facts and myths pertaining to fibromyalgia. Dialogues Clin Neurosci. 2018 Mar; 20(1): 53–6
- Hooten, W. M. (2018). Chronic pain and mental health disorders: Shared neural mechanisms, epidemiology, and treatment. Mayo Clin Proc; 91(7): 955-970.
- Hoskin, T., Whipple, M., Nanda, S., & Vincent, A. (2018). Longitudinal stability of fibromyalgia symptom clusters. Arthritis Research & Therapy; 20: 37.
- Jones, G.T., et al. (2015). Fibromyalgia in the general population. Arthritis & Rheumatology; 67(2): 568-575.
- Lier, R., et al. (2016). Familial risk of chronic MSK pain and the importance of physical activity and BMI: Prospective data from the HUNT study, Norway. PLoS ONE; 11(4): e0153828.doi:10.1371/juounal.pone.0153828.
- Lopez-Sola, M, et al. (2017). Towards a neurophysiological signature for FM. Pain; 158(1): 34-47.
- Macfarlane GJ et al. (2016). EULAR revised recommendations for the management of fibromyalgia. Ann Rheum Dis; 0: 1-11. doi:10.1136/annrheumdis-2016-209724

References

- Mckernan, L. Lenert, M., Crofford, L., & Walsh, C. (2018). Outpatient engagement lowers predicted risk of suicide attempts in fibromyalgia. Arthritis Care & Research. doi: 10.1002/acr.23748
- Moldofsky, H., Scarisbrick, P., & Smythe, H. (1975). Musculoskeletal symptoms and Non-REM sleep disturbance in patients with « fibrositis syndrome » and healthy subjects. Psychosomatic Medicine; July/ August.
- Muller, V., et al. (2017). Association of employment and health and well-being in people with fibromyalgia. J Rehab; 83(3): 37-43.
- Nakamura, I., et al. (2014). Epidemiologic internet survery of FM and chronic pain in Japan. Arthritis & Rheum; 66(7): 1093
- Painter, J., Crofford, L., & Talbert, J. (2013). Geographic variation of chronic opiods in FM. Clin Ther; 35(3): 303-311.
- Russell, J., et al. (1994). Elevated cerebrospinal fluid levels of substance P in patients with the FM syndrome. Arthritis & Rheumatism; 37(11): 1593-1601.
- Schrepf, A., et al. (2016). Endogenous opioidergic dysregulation of pain in fibromyalgia: A PET and fMRI study. Pain; 157(10): 2217-2225.
- Shi, H., et al. (2016). Gray matter abnormalities associated with FM: A meta-analysis of voxel-based morphometric studies. Seminars in Arthritis & Rheum; 46: 330-337.
- Tick, H., et al. (2018). Evidence-based nonpharmacologic strategies for comprehensive pain care: The consortium pain task force white paper. Explore; 14(3): 177-211.
- Toussaint, L., et al. (2015). Intra- and inter-patient symptom variability in fibromyalgia: Results of a 90 day assessment. Musculoskeletal Care; 13(2): 93-100.
- Uceyler, N., et al. (2013). Small fiber pathology in patients with fibromyalgia syndrome. Brain J of Neurology; 136: 1857-1867.
- Vincent, A. et al. (2014). OMERACT-based fibromyalgia symptom cluster analysis. Arthritis Research & Therapy; 416: 463.
- Vincent, A., et al. (2013). Beyond pain in FM: Insignts into the symptom of fatigue. Arthritis Research & Therapy; 15: 221-234.

References

- Walitt, B., Nahin, R., Katz, R., Bergman, M., & Wolfe, F. (2016). The prevalence and characteristics of fibromyalgia in the 2012 National Health Interview Survey. Plos one; 10(9): doi 10.1371
- Wiffen, P., et al. (2013). Antiepileptic drugs for neuropathic pain and fibromyalgia- an overview of cochrane reviews. Cochrane Database of Systematic Reviews; 11. DOI: 10.1002/14651858.CD010567.pub2
- Wolfe, F., et al. (2016). 2016 Revisions to the 2010/2011 FM diagnostic criteria. Seminars in Arthritis & Rheum; 46: 319-329.
- Wolfe, F., et al. (1990). ACR criteria for the classification of Fibromyalgia. A & R; 33(2):160-172.
- Wolfe, F. et al. (2010). The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity. A, C & R; 62(5): 600-610.
- Wolfe, F., Hassett, A., Walitt, B., & Michaud, K. (2011). Mortality in FM: A study of 8.186 patients over 35 ys. Arthritis Care & Research; 63(1): 94-101.
- Wolfe, F., Walitt, B., Katz, R., Michaud, K., & Hauser, W. (2013). Longitudinal patterns of analgesic and central acting drug use and associated effectiveness in FM. European J Pain; 17: 581-586
- Wolfe, F., Brahler, E., Hinz, A., & Hauser, W. (2013). Fibromyalgia prevalence, somatic symptom reporting, and the dimensionality of polysymptomatic distress: Results from a survey of the general population. Arithritis Care & Research; 65(5): 777-785.
- Wolfe et al. (2016). 2016 Revisions to the 2010/2011 fibromyalgia diagnostic criteria. Seminars in Arthritis and Rheumatism 46 (2016) 319–329
- Wu, Y.L., et al. (2017). Sleep disturbances in fibromyalgia: A meta-analysis of case-control studies. J Psychosomatic Res; 96: 89-97.
- Yazdany, J., et al. (2016). Rheumatology Informatics System for Effectiveness: A national informatics-enabled registry for quality improvement. A, C & R; ; 68(12): 1866-73.
- Yunus, M., et al. (1981). Primary fibromyalgia (fibrositis). Clinical study of 50 patients with matched normal controls. Seminars in Arthritis & Rheum; 11(1): 151-171

- http://painexhibit.org/en/galleries/pain-visualized/

Thank you!

Any Questions?