

Foundations of Pain Management: BioPsychoSocial Issues

Mi-CCSI

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University of Michigan Medical Center

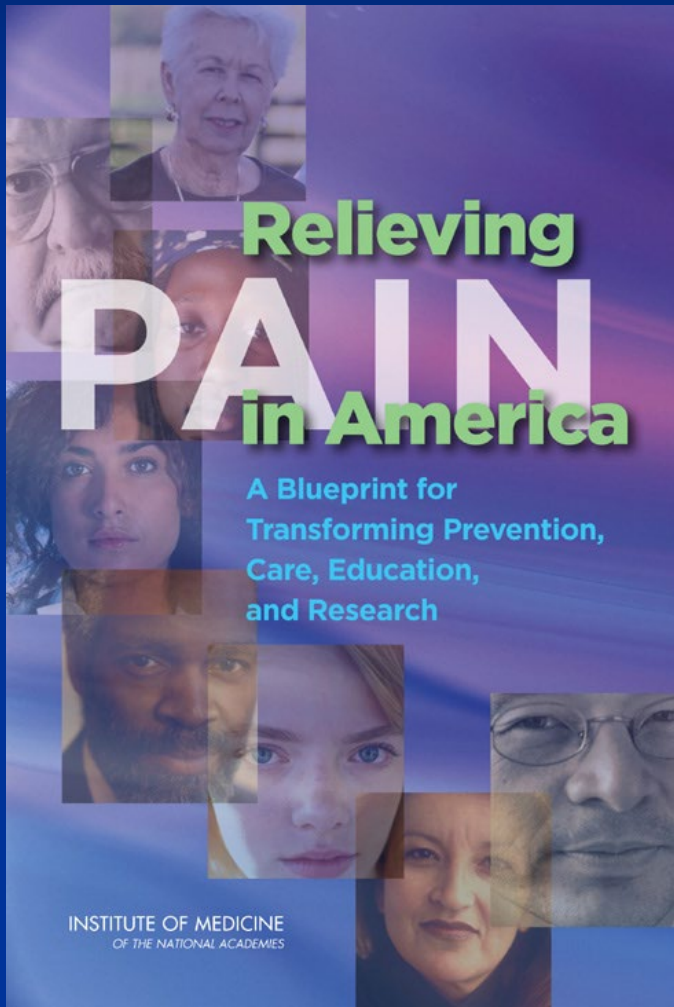
Ann Arbor, Michigan

Disclosures

- Consultant to Community Health Focus Inc.
- Immediate Past-President of the American Pain Society
- Funded for research by NIH

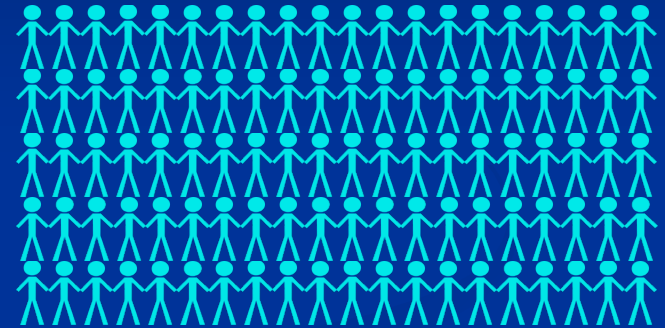
There will be no use of off-label medications in this presentation.

100 Million Individuals in the U.S. have Chronic Pain



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

Chronic Pain 100 Million



Diabetes 29.1 Million



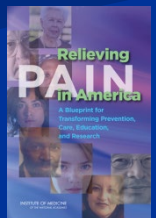
Heart Disease 27.6 Million



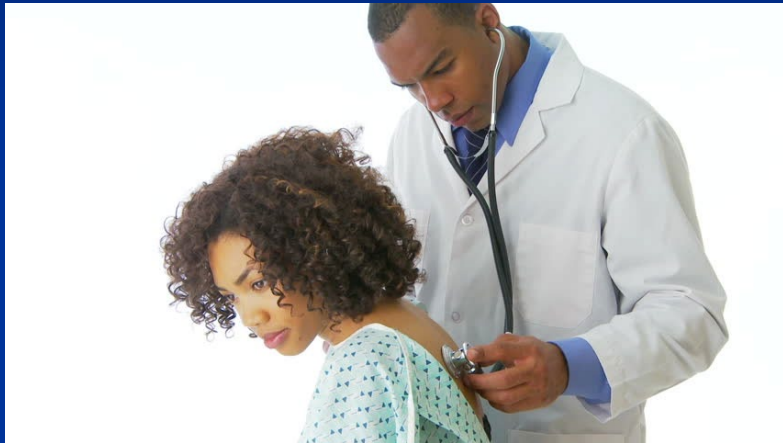
Cancer 13.7 Million



 = 1 Million individuals



Most Pain Care Visits occur within Primary Care



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

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 |

Facet blocks: Limited evidence

Slipman CW, Bhat AL, Gilchrist RV, Isaac Z, Chou L, Lenrow DA. A critical review of the evidence for the use of zygapophysial injections and radiofrequency denervation in the treatment of low back pain. *Spine J.* 2003; 3:310-316.

Carette S, Marcoux S, Truchon R, et al. A controlled trial of corticosteroid injections into facet joints for chronic low back pain. *N Eng J Med.* 1991; 325:1002-1007.

Biomedical Model Generally: Limited evidence

Chou R, Loeser JD, Owens DK, et al. Interventional therapies, surgery, and interdisciplinary rehabilitation for low back pain: an evidenced-based clinical practice guideline from the American Pain Society. *Spine.* 2009; 34:1066-1077.

Hogan QH, Abram SE. Neural blockade for diagnosis and prognosis: a review. *Anesthes.* 1997; 86:216-241.

Merrill DG. Hoffman's glasses: evidenced-base medicine and the search for quality in the literature on pain medicine. *Reg Anesth Pain Med.* 2003; 28:547-560.

Staal JB, de Bie RA, de Vet HCW, Hildebrandt J, Nelemans P. Injection therapy for subacute and chronic low back pain: an updated Cochrane review. *Spine.* 2009; 34:49-59.

Epidural steroid injections: Limited evidence

Armon C, Argoff CE, Samuels J, Backonja M. Assessment: use of epidural injections to treat radicular lumbosacral pain: report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. *Neurology.* 2007; 68:723-729.

Bowman SJ, Wedderburn L, Whaley A, Grahame R, Newman S. Outcome assessment after epidural corticosteroid injection for low back pain and sciatica. *Spine.* 1993; 18:1345-1350.

Carette S, Leclaire R, Marcoux S, et al. Epidural corticosteroid injections for sciatica due to herniated nucleus pulposus. *N Eng J Med.* 1997; 336:1634-1640.

Koes BW, Scholten RJPM, Mens JMA, Bouter LM. Efficacy of epidural steroid injections for low-back pain and sciatica: a systematic review of randomized clinical trials. *Pain.* 1995; 63:279-288.

If Patients don't respond to the BioMedical model...

- They must be crazy
- The pain is all in their heads
- They don't want to get better

If Patients don't respond to the BioMedical model...

- They must be crazy
- The pain is all in their heads
- They don't want to get better

OR perhaps

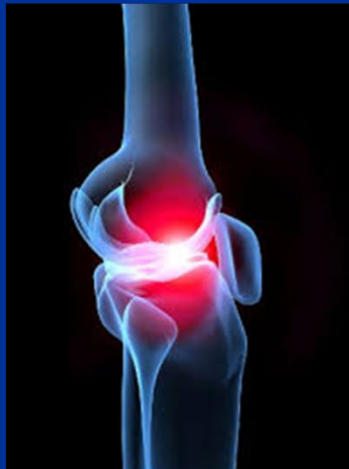
- We don't fully understand pain
- Treatment of pain requires a different approach than the traditional biomedical model
- Effective pain treatment requires a different financial model

How is Pain Classified?

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

Newest Classification: Pain Mechanisms

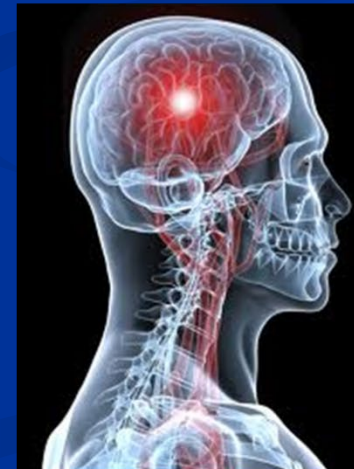
Nociceptive
Peripheral damage
or inflammation



Neuropathic



Central



Mechanisms of Pain

**Nociceptive
and
Inflammatory**

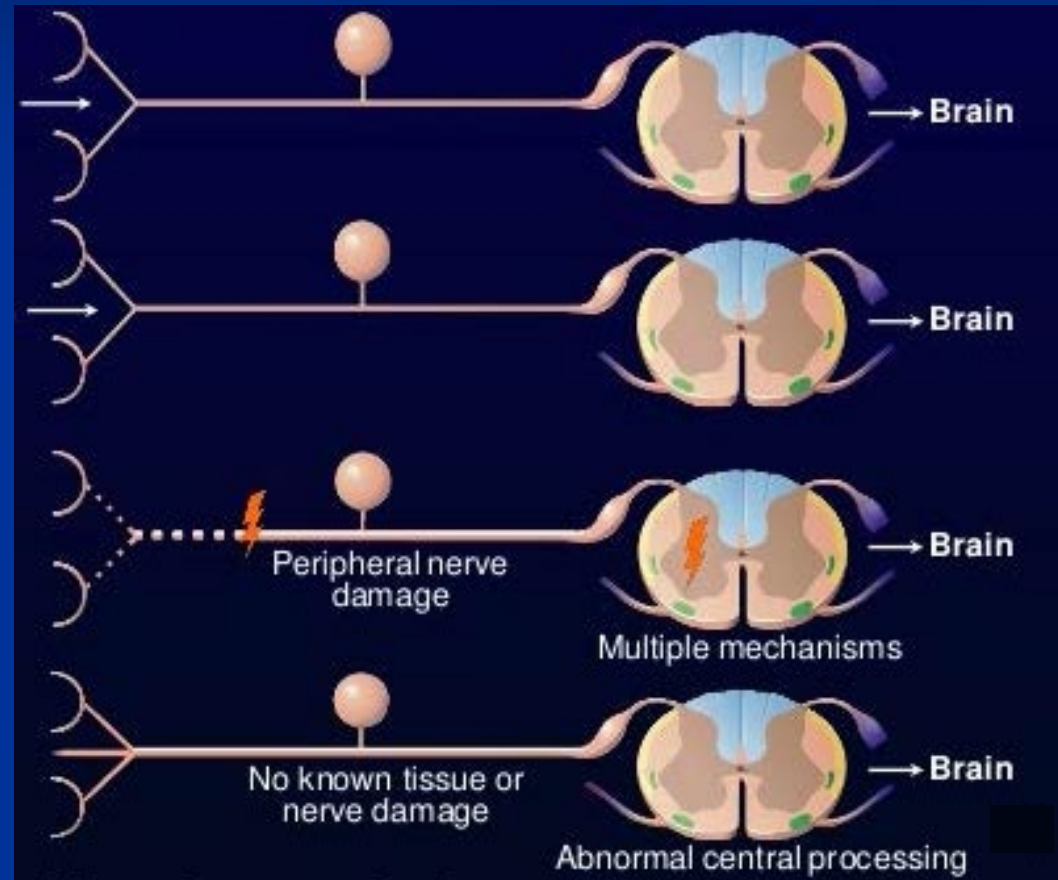
Noxious
Peripheral Stimuli

Inflammation

Neuropathic

Peripheral or
Central damage

Centrally Driven Pain



Mechanisms of Pain

**Nociceptive
and
Inflammatory**

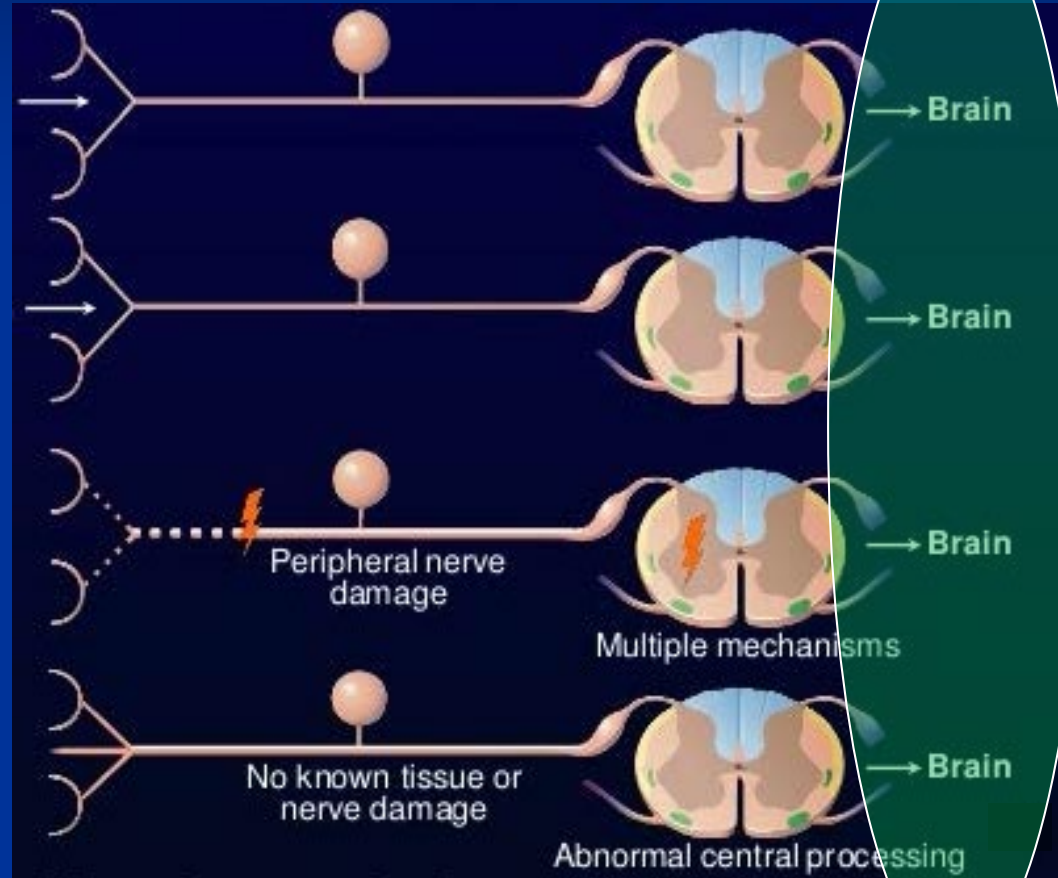
Noxious
Peripheral Stimuli

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Peripheral or
Central damage

Centrally Driven Pain



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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I still feel
pain

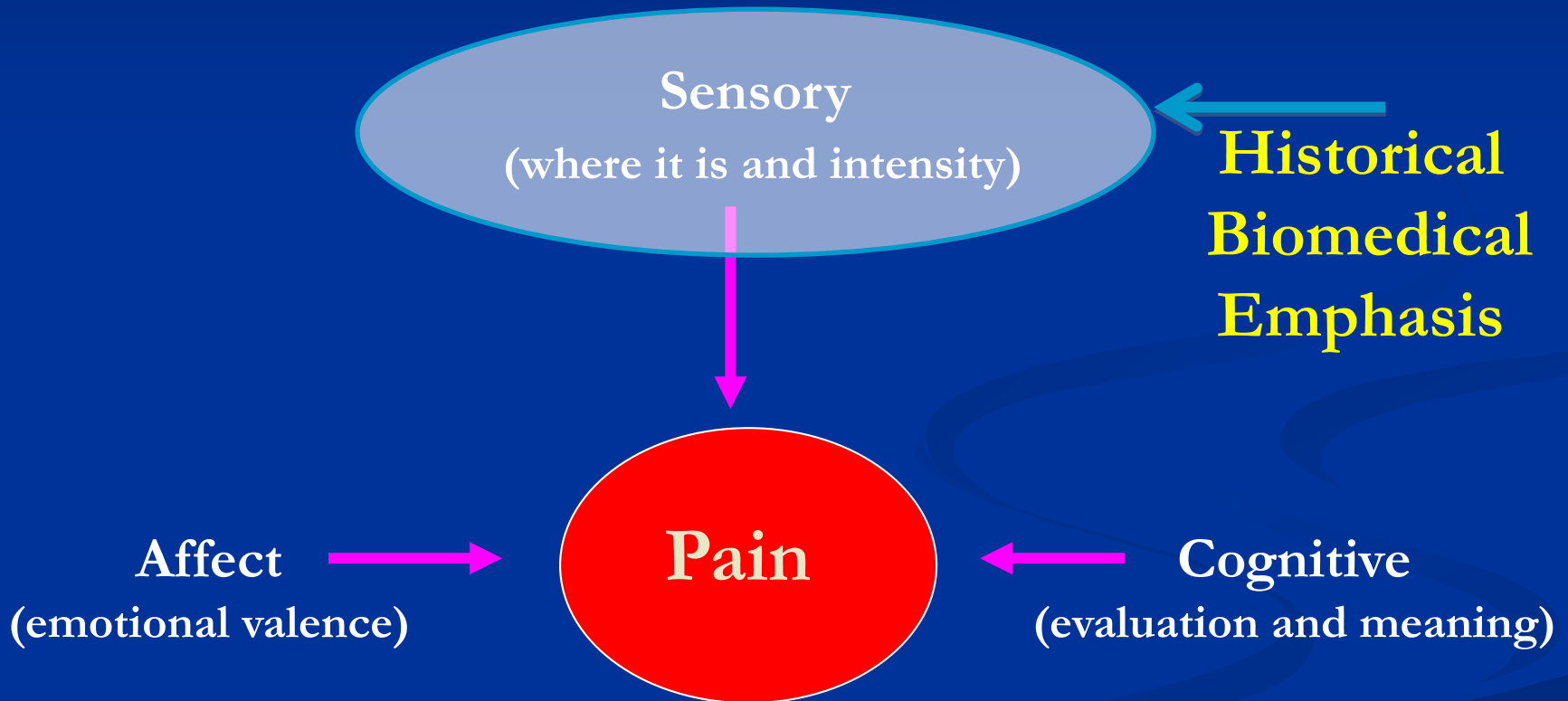


Chronic Pain

- Similar in mechanism to an emotion but experienced as a bodily sensation



Chronic Pain has Three Components: The BioMedical Model Focuses on 1 of Them



CNS Neurotransmitters

Influencing Pain

Facilitation

Gabapentinoids,
ketamine

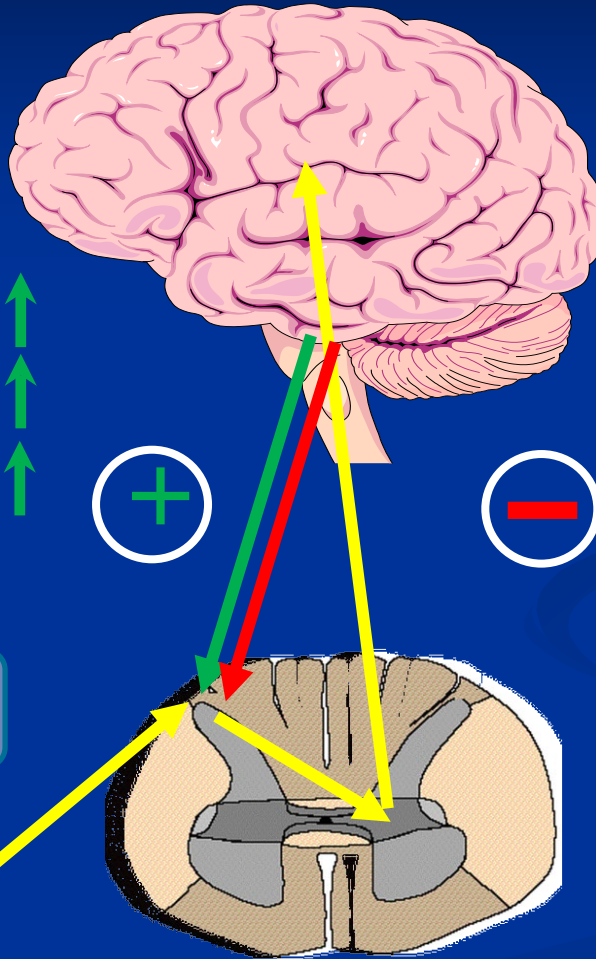
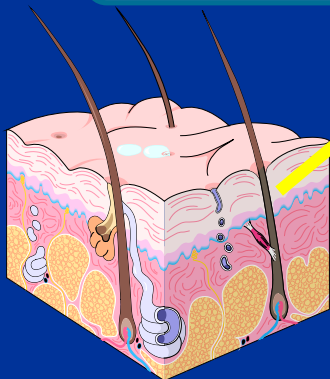
Glutamate and EAA

Substance P

Nerve growth factor

Serotonin
(5HT_{2a, 3a})

Anti-migraine drugs (-
triptans),
cyclobenzaprine



Inhibition

Descending anti-nociceptive pathways

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

Tricyclics, SNRIs,
tramadol

Opioids

Low dose naltrexone

Cannabinoids

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

GABA

Gammahydroxybutyrate,
moderate alcohol
consumption

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

Neurotransmitters for Pain Processing

Norepinephrine

Concentration

Circadian rhythms

Attention

Stress

Energy

Neurotransmitters for Pain Processing

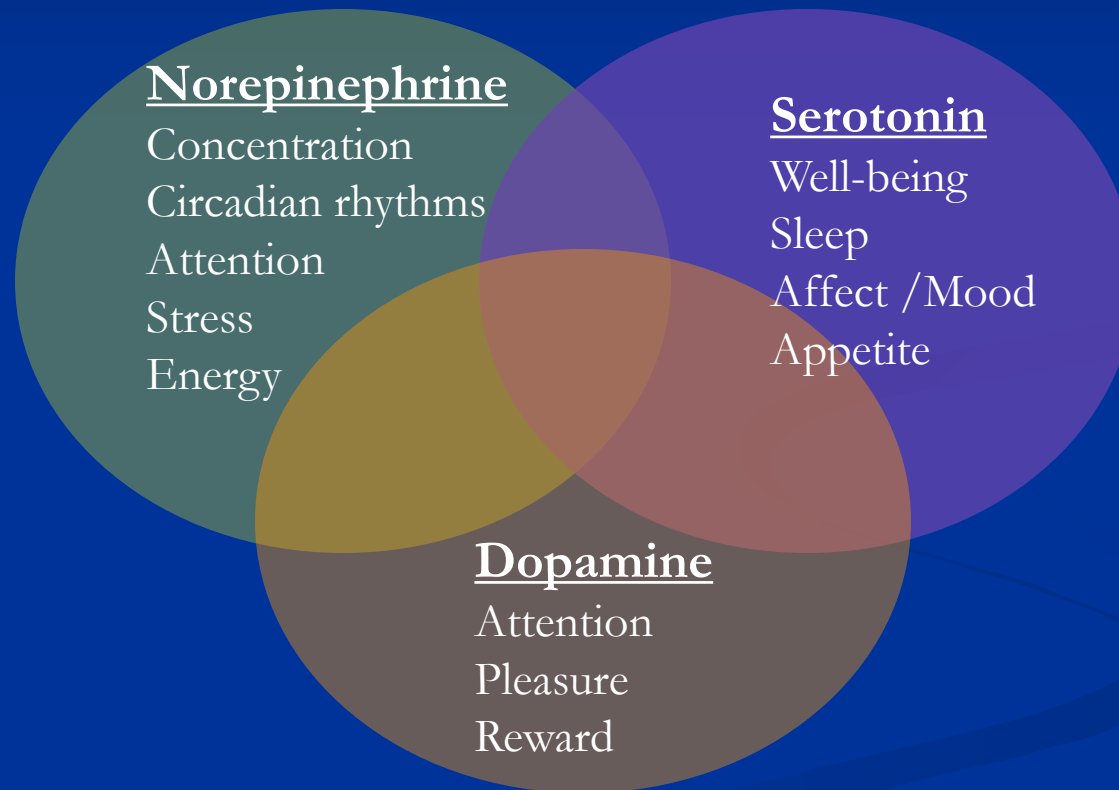
Norepinephrine

Concentration
Circadian rhythms
Attention
Stress
Energy

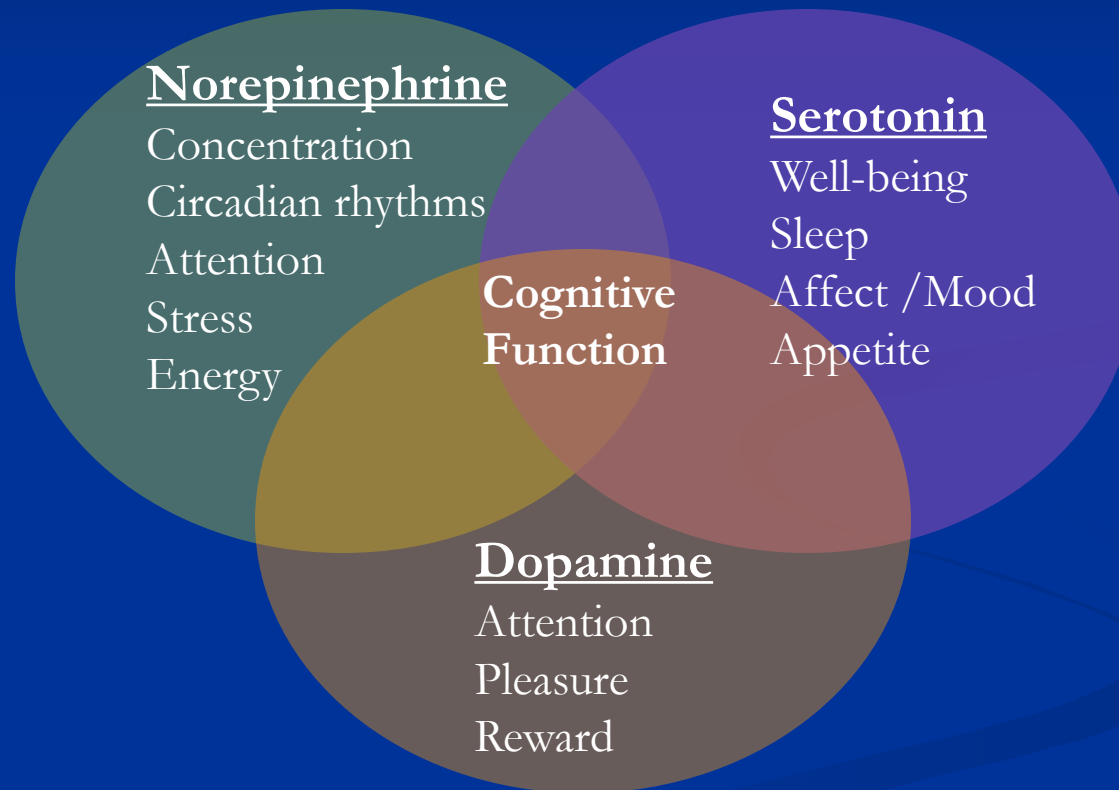
Serotonin

Well-being
Sleep
Affect /Mood
Appetite

Neurotransmitters for Pain Processing



Neurotransmitters for Pain Processing



Neurotransmitters for Pain Processing

Glutamate

Major Exciter of CNS, Synaptogenesis and neurogenesis

Norepinephrine

Concentration
Circadian rhythms
Attention
Stress
Energy

Serotonin

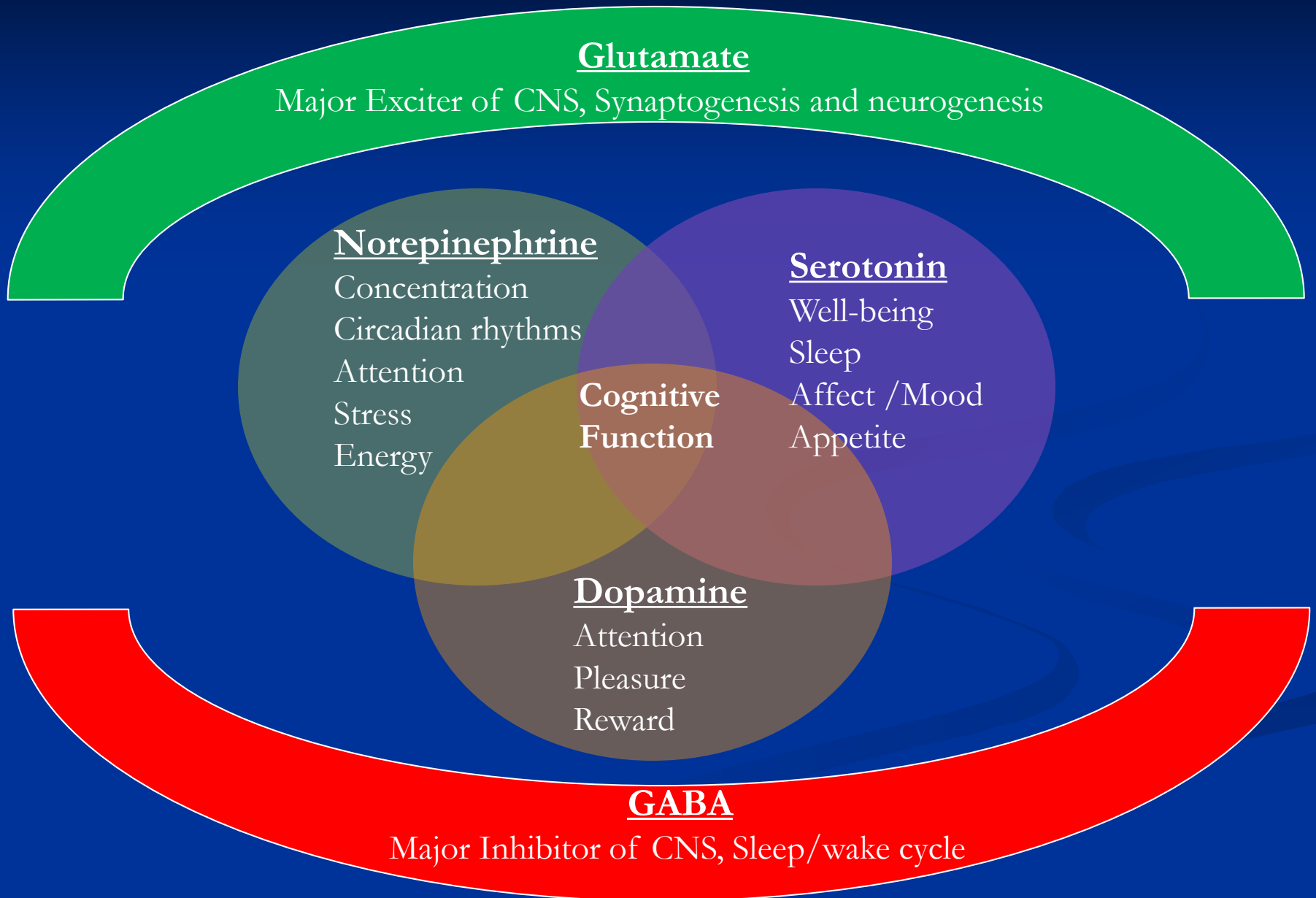
Well-being
Sleep
Affect /Mood
Appetite

Cognitive Function

Dopamine

Attention
Pleasure
Reward

Neurotransmitters for Pain Processing



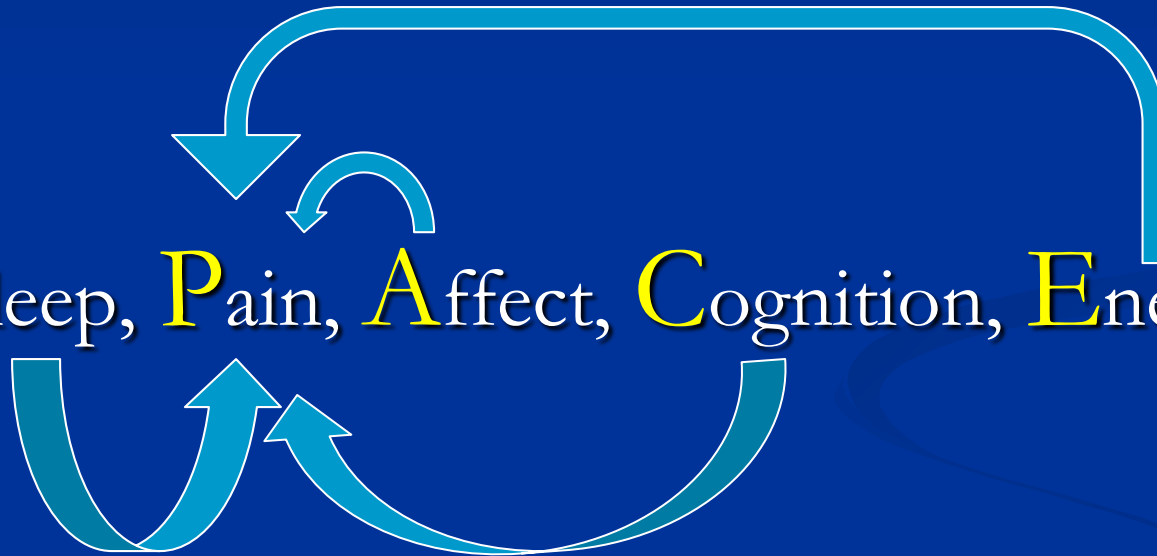
Shared Neurotransmitters Explain

- 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



- New targets for treating pain perception

A Closer Look at Central Pain

Pain

Pain

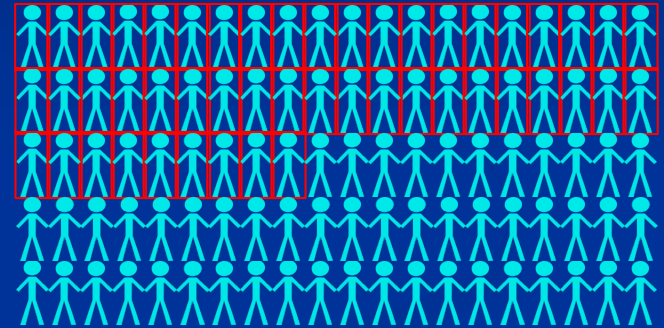


Pain

Pain

In U.S., More people have Chronic Pain than Diabetes, Heart Disease, and Cancer Combined

Chronic Pain 100 Million



Diabetes 29.1 Million



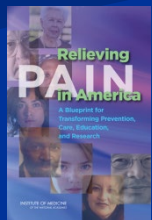
Heart Disease 27.6 Million



Cancer 13.7 Million



 = 1 Million individuals



Chronic Overlapping Pain Conditions

| COPCs | US Prevalence |
|--|----------------------|
| Irritable Bowel Syndrome | 44 Million |
| Temporomandibular Disorder | 35 Million |
| Chronic Low Back Pain | 20 Million |
| Interstitial Cystitis / Bladder Pain Syndrome | 8 Million |
| Migraine Headache | 7 Million |
| Tension Headache | 7 Million |
| Endometriosis | 6 Million |
| Vulvodynia | 6 Million |
| Fibromyalgia | 6 Million |
| Myalgic Encephalopathy / CFS | 4 Million |

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

Central Sensitization

Clinical Assessment:

- Pain disproportionate to nature and extent of injury (not nociceptive)
- Not due to lesions or damage within CNS (not neuropathic)
- Wide-spread pain distribution
- General hypersensitivity of senses, stress, emotions, mental load,
- S.P.A.C.E.



Thinking Differently about Chronic Pain (1)

- Acute pain often has 1:1 relationship between tissue damage and pain.
 - Chronic pain does not.
 - Similar in mechanism to an emotion but experienced as a bodily sensation



Thinking Differently about Chronic Pain (3)

- 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 (4)

- Treating a perception requires different techniques than fixing damaged tissues
- Pain Treatment too often focuses on fixing some body part and not on how pain is processed

Functioning Detector



- Beeps when smoke is present
- Warns of fire
- Behavior:
 - Search for fire
 - Put out fire
- Detector is silent when fire is out

Functioning Detector



- Beeps when smoke is present
- Warns of fire
- Behavior:
 - Search for fire
 - Put out fire
- Detector is silent when fire is out
- Acute/Nociceptive pain

Broken Detector



- Beeps due to processing malfunction
- Behavior:
 - Search for fire?
 - Throw water?
- Better Behavior:
 - Fix the processor in the detector
- Chronic / Central Pain



Neurology: headache



GI, Urology: IBS UCPPS



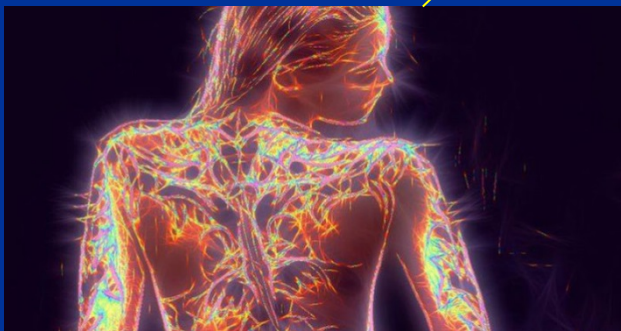
Rehab, Neurology: LBP



Dentistry: TMD



OBGYN: Endo, VVD



Rheumatology: FM



Infectious Disease: ME/CFS

Action of Non-Pharmacological Interventions across COPC's

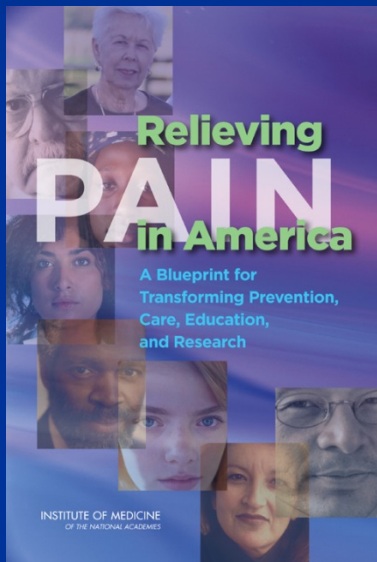
- Interventions that are successful at desensitizing or calming CNS activity associated with central sensitization are likely to be beneficial across conditions
- Interventions that diminish “central load” are likely to be helpful over time. It takes time to calm (reset) a sensitized CNS.

So what's a doctor to do?

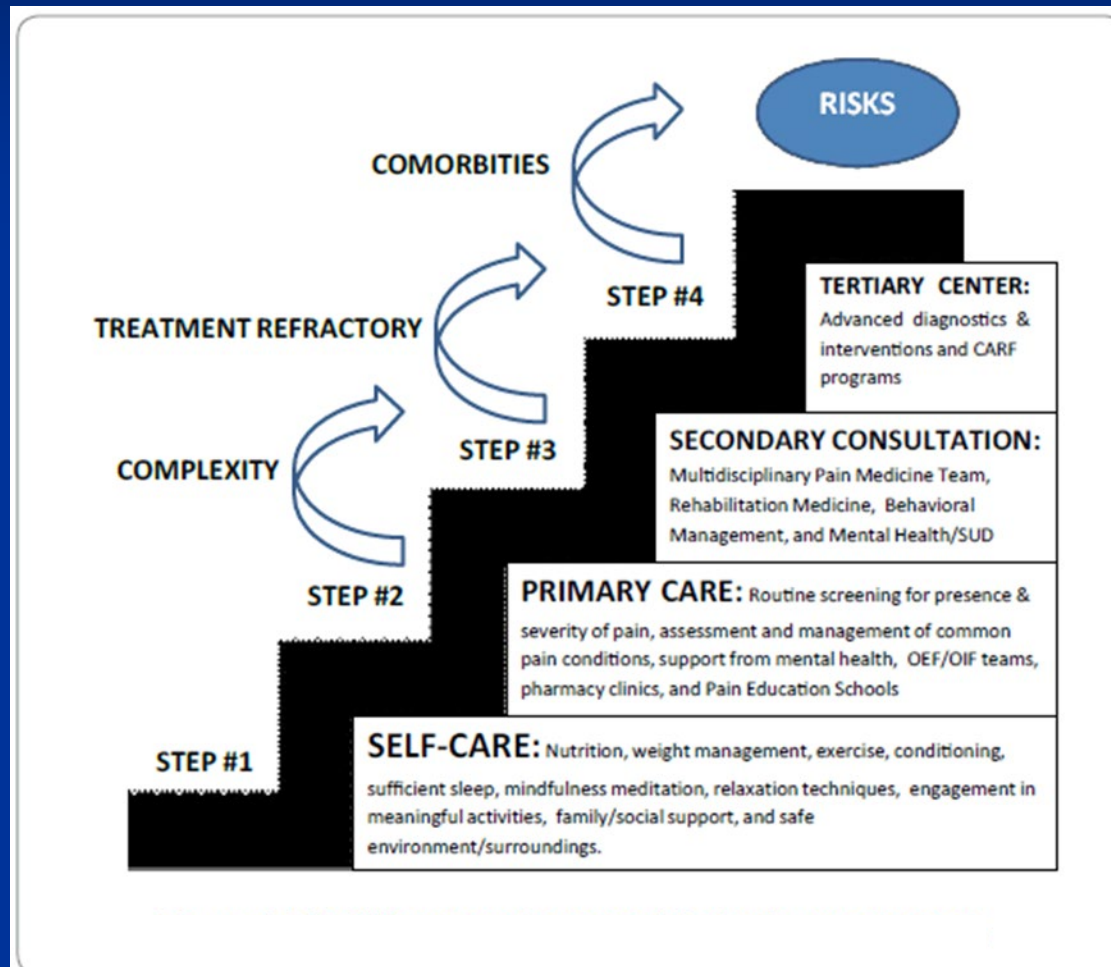


Recommendations in Multiple Federal Documents

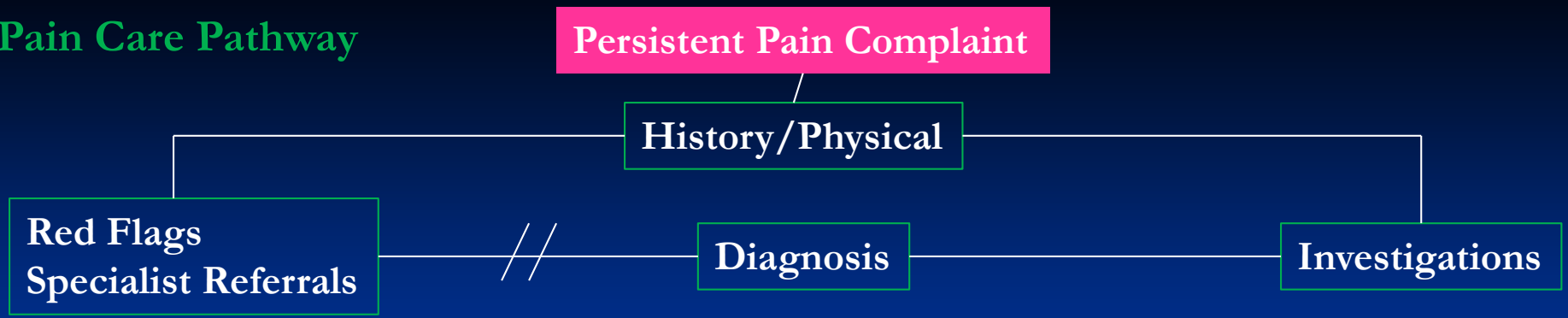
Self-Management, Evidence-Based, Patient-Centric, Multi-Modal Pain Care



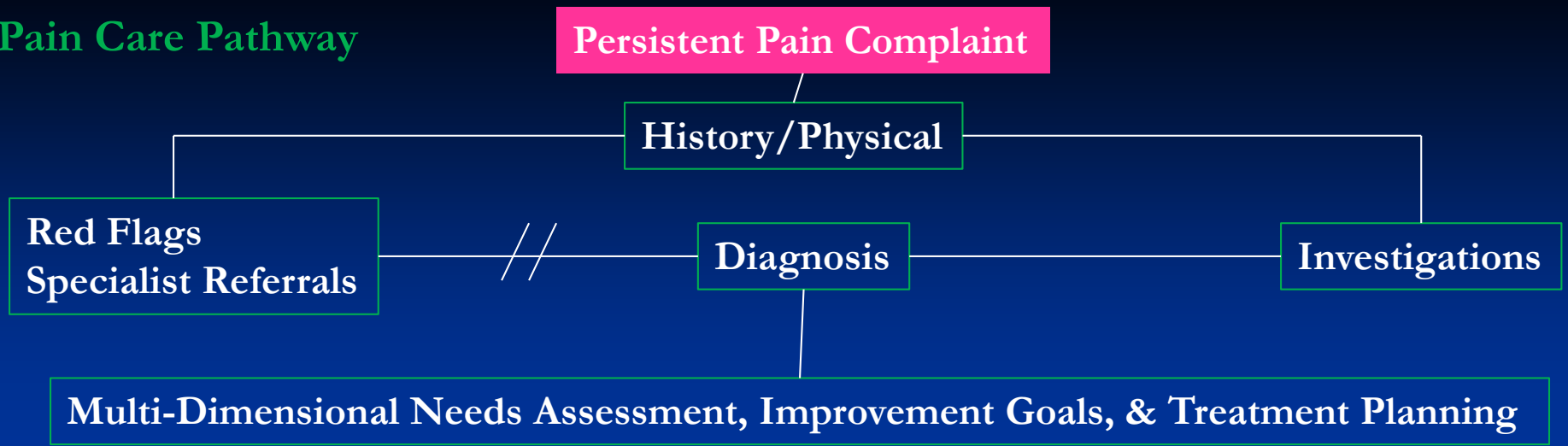
VA's Stepped Care Model of Pain Management



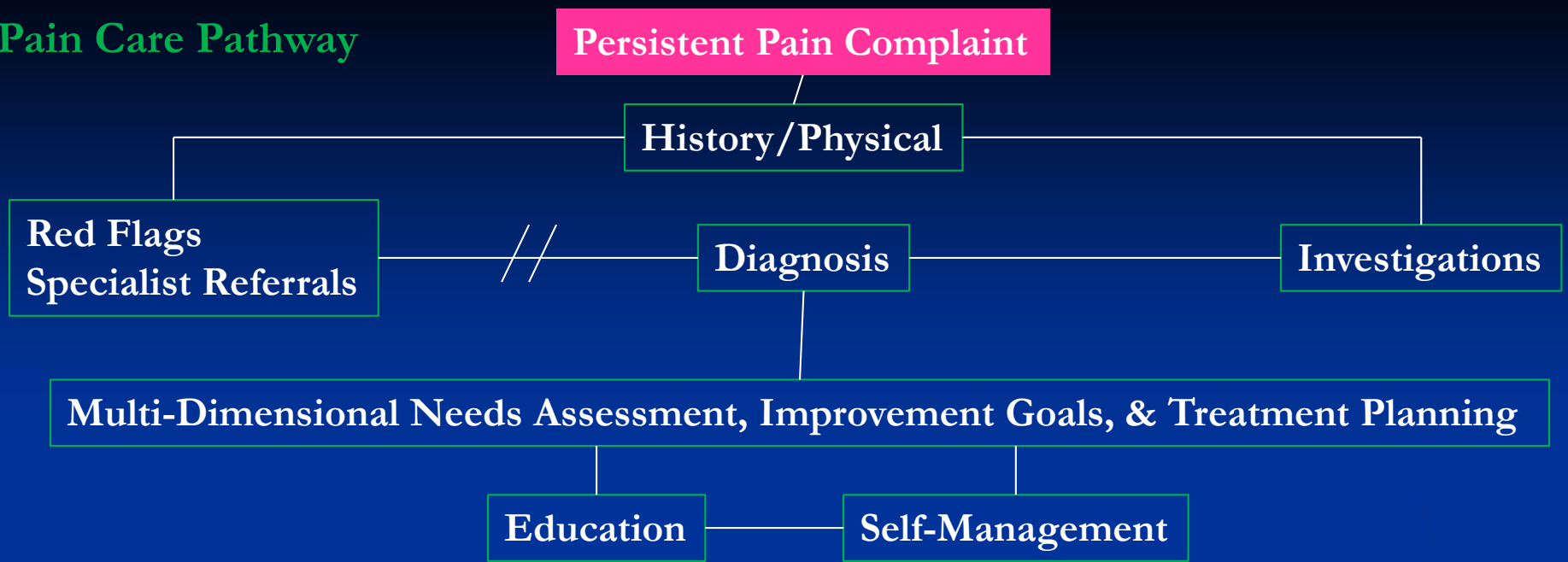
Pain Care Pathway



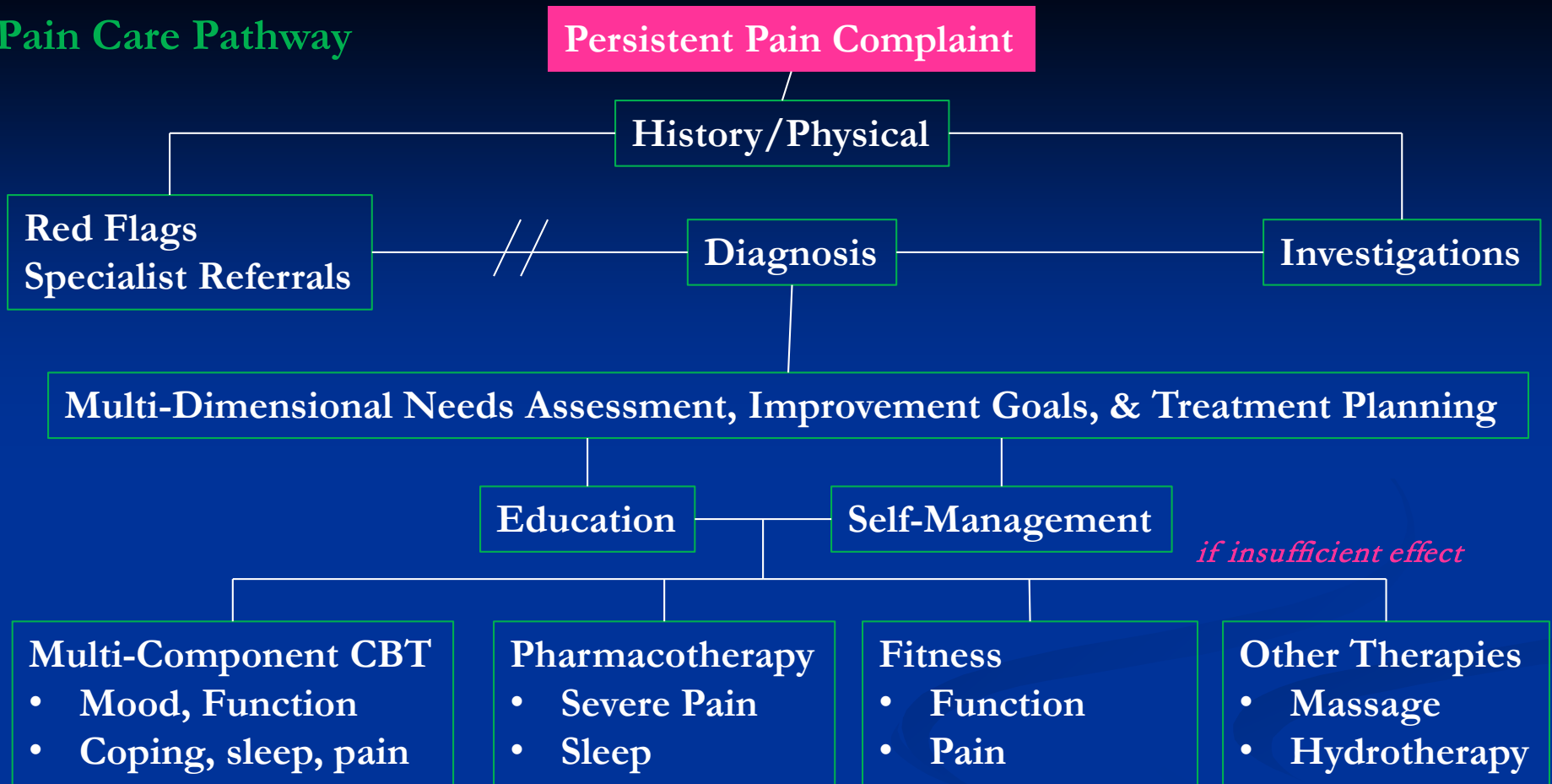
Pain Care Pathway



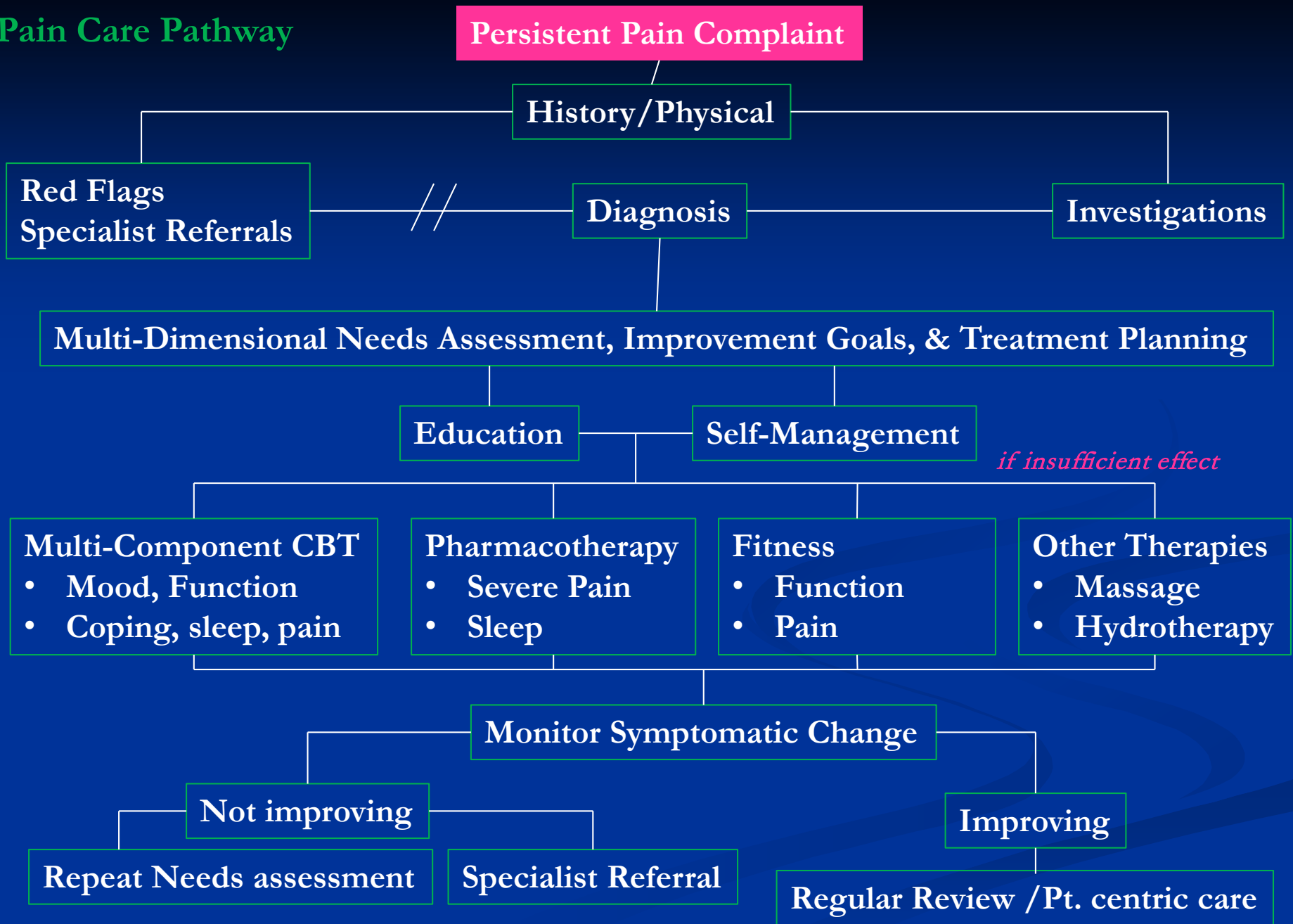
Pain Care Pathway



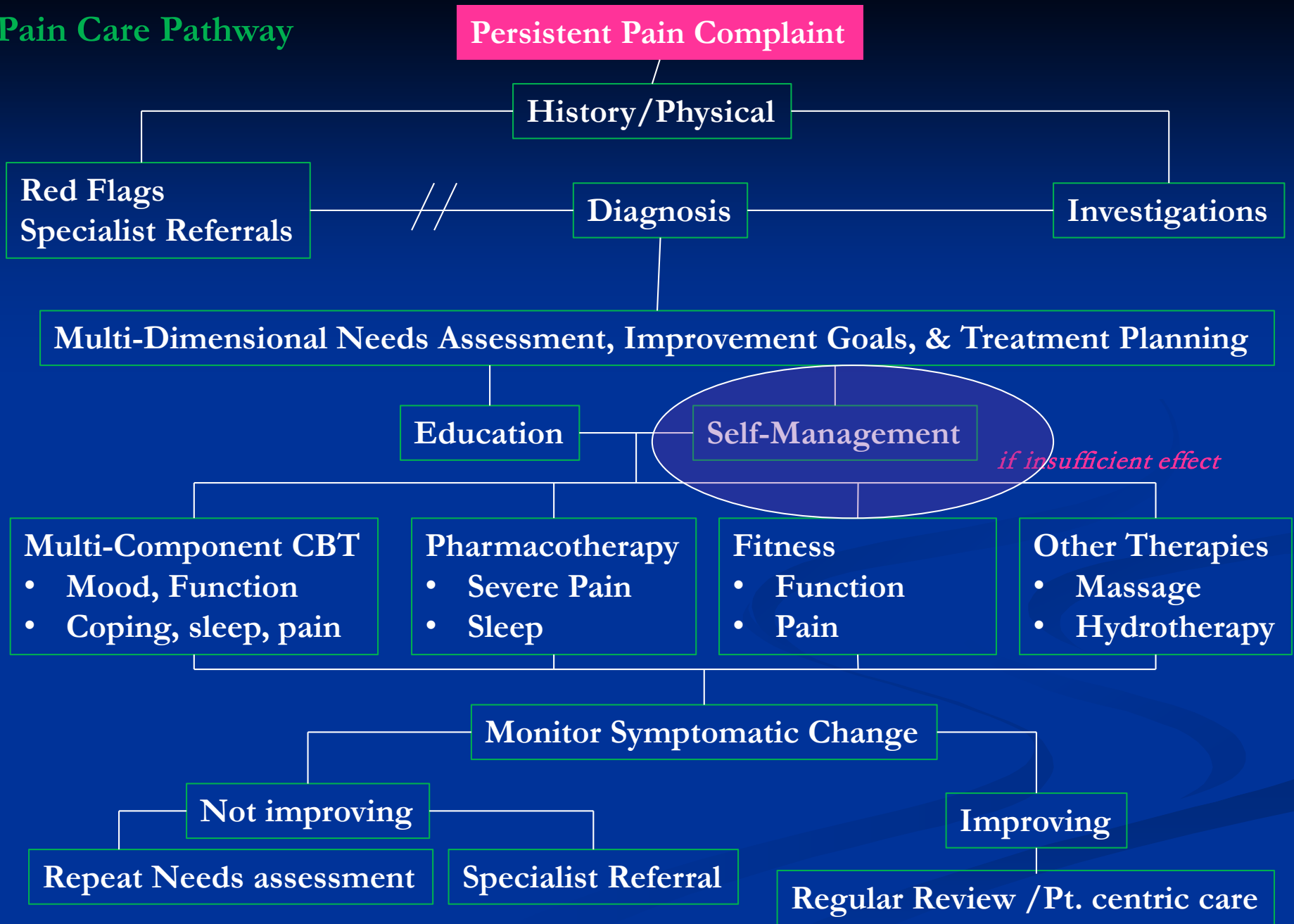
Pain Care Pathway



Pain Care Pathway



Pain Care Pathway



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

Emotions

Reflections

Actions

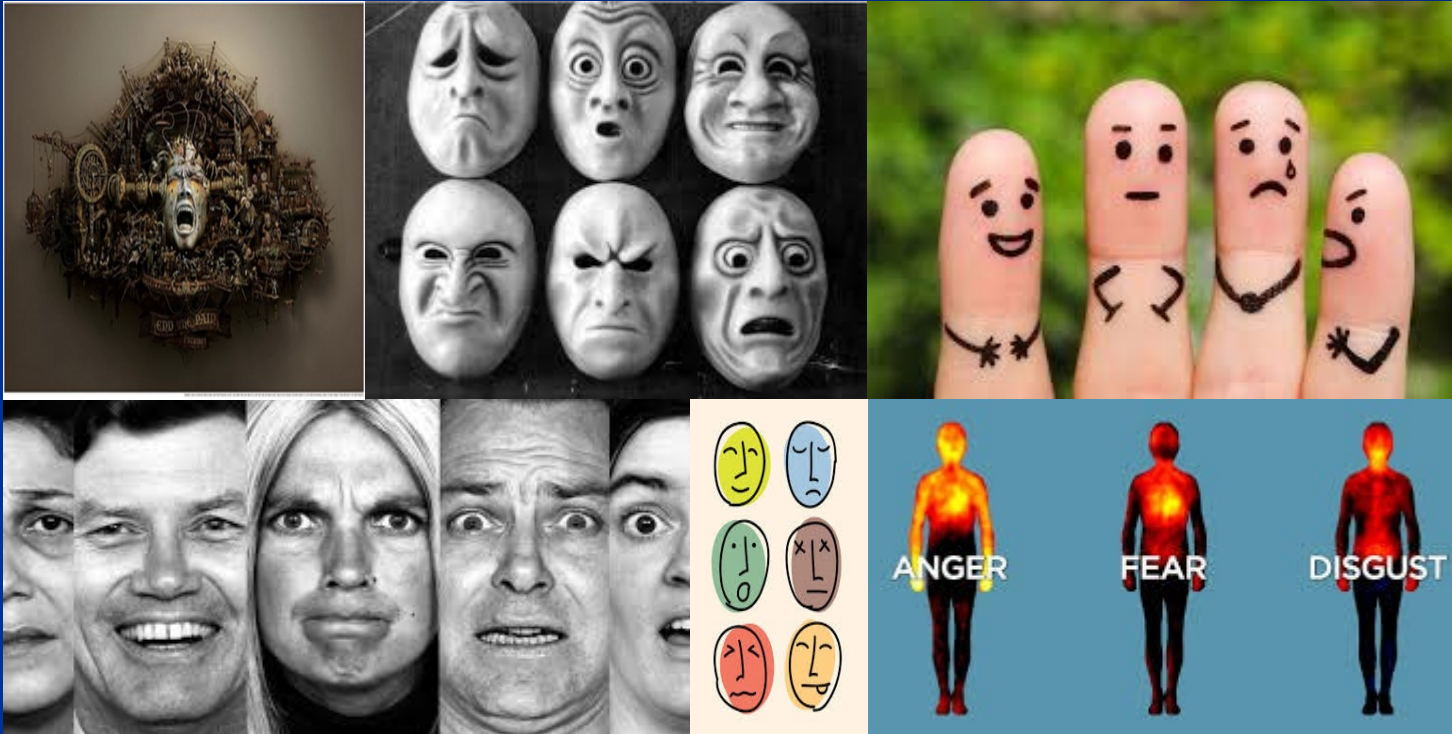
Sleep

Environment



Sleep, Pain, Affect, Cognitive changes, Energy deficits

Emotions



Altering pain perception through Emotions

Psychiatric Co-Morbidities



Psychiatric Co-Morbidity in Chronic Pain

| | <u>Depression</u> | <u>Anxiety</u> |
|----------------------------|-------------------|----------------|
| General Population: | 6.6% | 18.1% |
| Chronic Pain: | 30-54% | |

Personality Disorders in Chronic Pain Patients

Personality Disorders

gen. pop: 5%-15%

chronic pain: 51%-58%

Cluster A:

Odd/Eccentric

- *Paranoid
- *Schizoid
- Schizotypal

44%

Cluster B

Emotional/Erratic

- Antisocial
- *Histrionic
- Narcissistic
- Borderline

31%

Cluster C

Anxious/Fearful

- Avoidant
- *Dependent
- OCPD

25%

Personality Disorders

Predictive of transition from acute to chronic status

Sub clinical P.D. impacts pain and treatment compliance

**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)

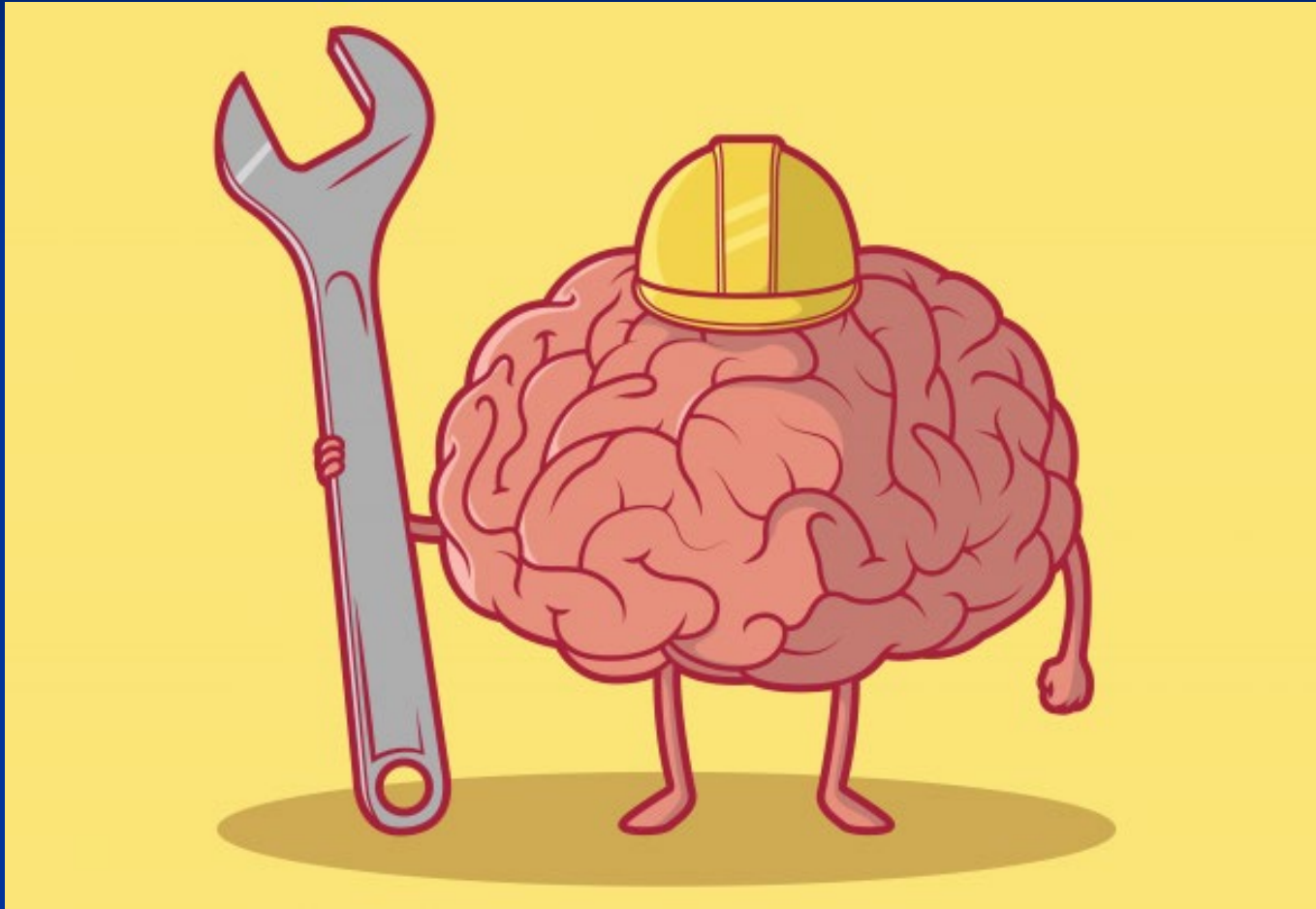


Pleasant Activity Scheduling



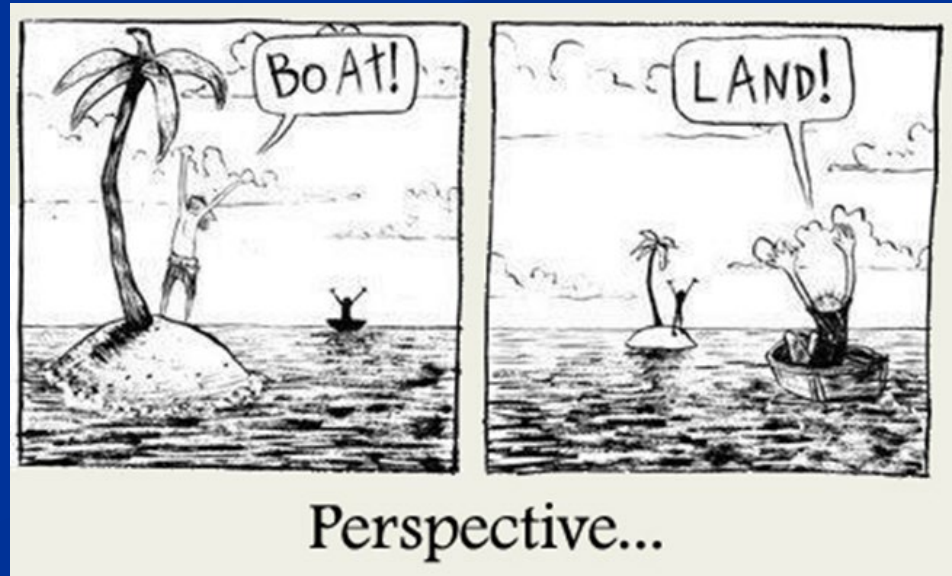
Traditional Psychotherapy

Reflections



Using Cognition to alter pain perceptions

Reframing



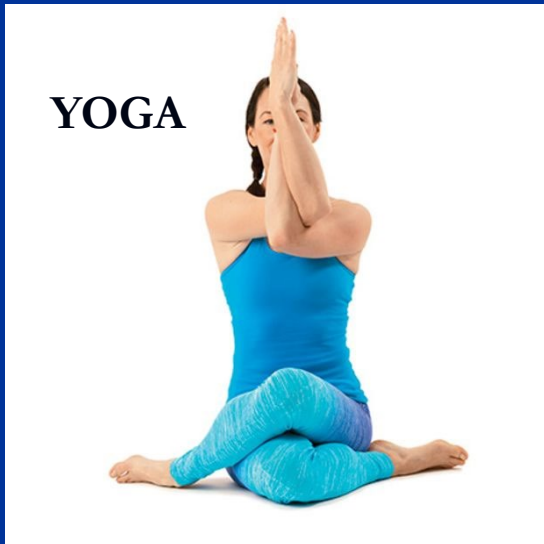
The Relaxation Response



Visual Imagery



Meditation



Biofeedback

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



Pacing for Energy Efficiency



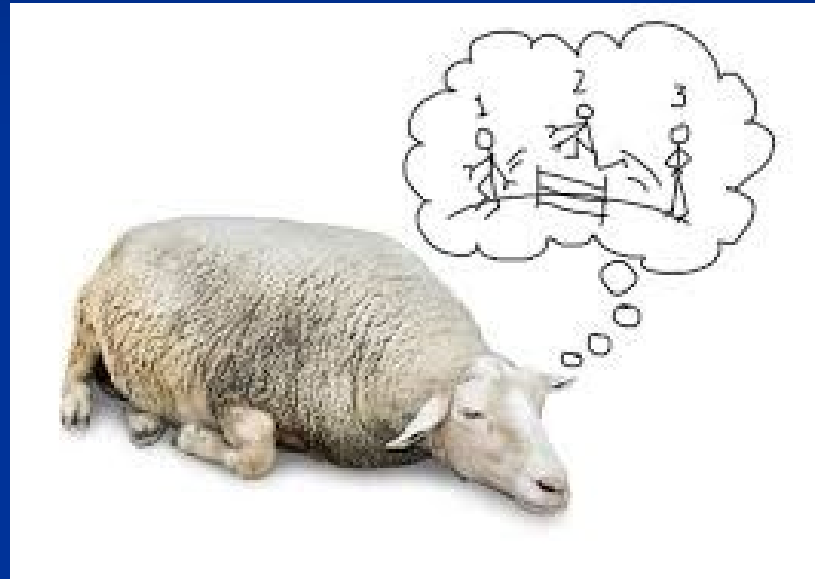
Problem Solving / Goal Setting



Nutrition



Sleep



Altering Pain via Sleep

Environment



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

Social Challenges



Dr. -Patient



Friends

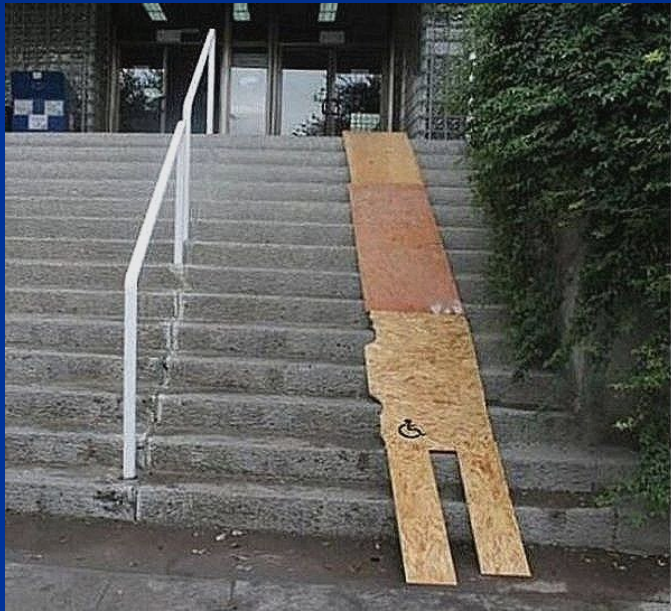


Family



Employer and co-workers

Physical Challenges



Web-based self-management “FibroGuide”

FibroGuide

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Getting started
Steps for me
FibroGuide modules
About us

FibroGuide Modules

FibroGuide Menu MINIMIZE

Tell Me How FibroGuide Works Steps for Me

STEPS

Understanding Fibromyalgia Communicating Being Active
Sleep Relaxation What is Fibro Fog?
Setting Goals Pacing Yourself Thinking Differently
Time for You

Color Key: Step My Steps Visited Step

Back Forward

Use the **FibroGuide** menu to navigate the program. Once you make a selection, the menu will minimize to the bottom of your screen. You can always access it by clicking on the arrow in the upper corner of the menu.

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FibroGuide

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About us

Pacing Yourself

Feeling well and doing too much

Have you ever done too much when you felt well and then “paid for it” later? If so, you may have fallen into a frustrating cycle in which you overdo it and then feel worse, which then causes you to have more pain and fatigue. Overexerting yourself can cause a flare-up, which is a term that is used to describe a transient appearance or worsening in symptoms such as feeling muscle and joint pain, feeling tired, or having trouble getting the right kind of sleep.

When you get caught up in this catch-up/flare-up cycle, you may:

- Feel well and do too much
- Have a flare-up
- Fall behind in tasks while you rest and recover
- Repeat the cycle when you feel well again

Many people with fibromyalgia may find it easier to fall into this catch-up/flare-up cycle because tasks, like household chores, that used to be quick and simple may now take longer to complete. This can make it hard to accomplish everything that you need to do each day. As a result, you may feel the need to make up for bad days by playing catch-up on good days.

Do more by pacing yourself

Learning how to pace yourself can help you break this catch-up/flare-up cycle. Pacing

Page 1 of 4

Inside This Step:

- Feeling well and doing too much
- It's time to pace yourself
- Put it into practice
- A note for family and friends

Added Features:

- Pacing Yourself Work Sheet
- Expert Advice

Download this Step:

Test Size Break Notice On

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<http://fibroguide.med.umich.edu/>

Pain Care Pathway

Persistent Pain Complaint

History/Physical

Red Flags
Specialist Referrals

Diagnosis

Investigations

Multi-Dimensional Needs Assessment, Improvement Goals, & Treatment Planning

Education

Self-Management

if insufficient effect

Multi-Component CBT

- Mood, Function
- Coping, sleep, pain

Pharmacotherapy

- Severe Pain
- Sleep

Fitness

- Function
- Pain

Other Therapies

- Massage
- Hydrotherapy

Monitor Symptomatic Change

Not improving

Improving

Repeat Needs assessment

Specialist Referral

Regular Review /Pt. centric care

Pharmacological Therapies for Central Pain States

Strong Evidence

- Dual reuptake inhibitors such as
 - Tricyclic compounds (amitriptyline, cyclobenzaprine)
 - SNRIs and NSRIs (milnacipran, duloxetine, venlafaxine?)
- Anticonvulsants (e.g., pregabalin, gabapentin)

Modest Evidence

- Tramadol
- Older less selective SSRIs
- Gamma hydroxybutyrate
- Low dose naltrexone
- Cannabinoids

Weak Evidence

- Growth hormone, 5-hydroxytryptamine, tropisetron, S-adenosyl-L-methionine (SAME)

No Evidence

- Opioids, corticosteroids, nonsteroidal anti-inflammatory drugs, benzodiazepine and nonbenzodiazepine hypnotics, guanifenesin

Non-Pharmacological Therapies for Chronic Pain States

Strong Evidence

- Education
- Aerobic exercise
- Cognitive behavior therapy

Modest Evidence

- Strength training
- Hypnotherapy, biofeedback, balneotherapy

Weak Evidence

- Acupuncture, chiropractic, manual and massage therapy, electrotherapy, ultrasound

No Evidence

- Tender (trigger) point injections, flexibility exercise



Dually Focused Management of Chronic Pain

Symptoms of Pain, Fatigue, etc.

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

Pharmacological therapies to improve symptoms

Functional Consequences of Symptoms

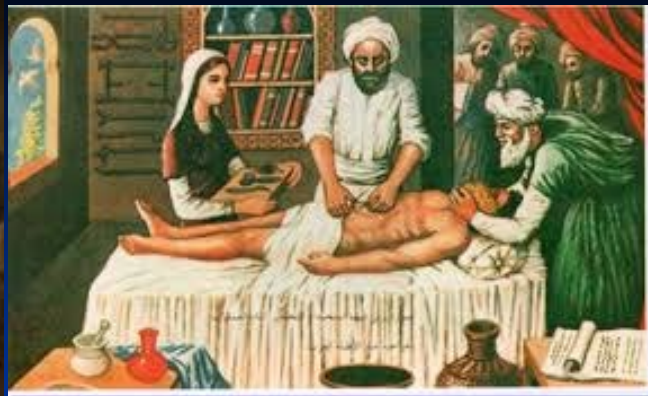
- Increased Distress
- Decreased activity
- Isolation
- Poor sleep
- Maladaptive illness behaviors

Nonpharmacological therapies to address dysfunction



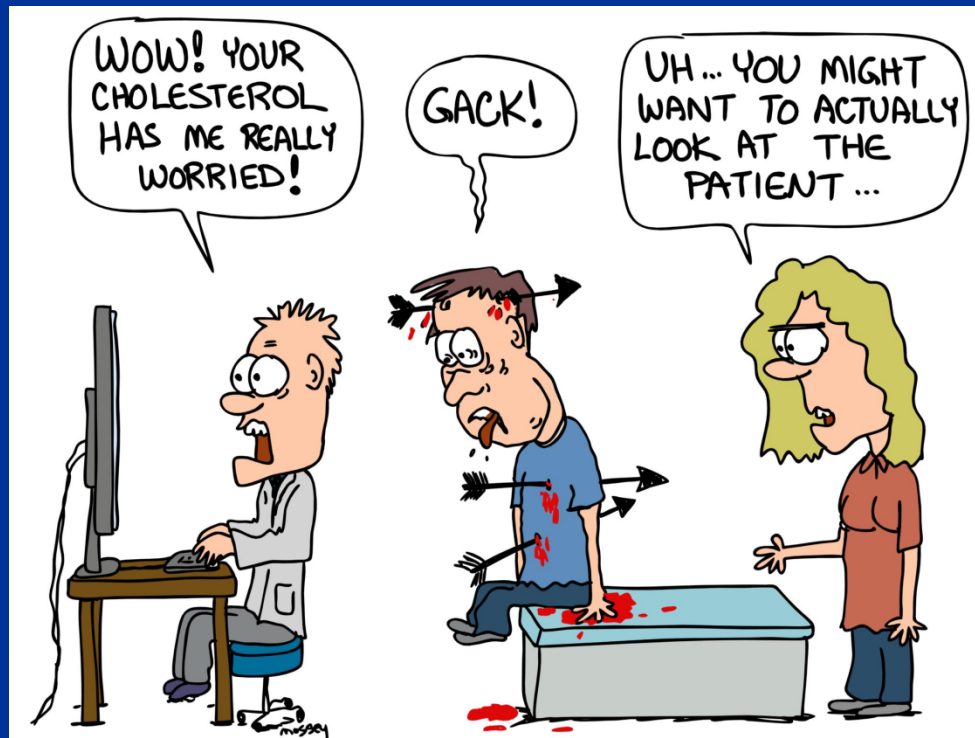
Intervening in the PCP Encounter







Where's the patient?





HARVARD
MEDICAL SCHOOL

Are we losing touch — literal touch — in the doctor-patient relationship?

Sacha Pfeiffer August 18, 2014

<https://hms.harvard.edu/news/>

KHN
KAISER HEALTH NEWS

Patients Lose When Doctors Can't Do Good Physical Exams

By Sandra G. Boodman | May 20, 2014

*This KHN story was produced in collaboration with **The Washington Post***

By MARLYS HARRIS / MONEYWATCH / May 2, 2011, 12:20 PM

Are Doctors Losing Their Touch?

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Last Updated May 13, 2011 1:07 PM EDT

The New York Times

HEALTH

Are Doctors Losing Touch With Hands-On Medicine?

By ABIGAIL ZUGER JULY 13, 1999

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Not on the Doctor's Checklist, but Touch Matters

DANIELLE OFRI and M.D. AUG. 2, 2010



AP / Tony Dejak



Three things you can Practice Tomorrow

- 1. Maximize the power of touch through physical exam
- 2. You don't always need to have a psychologist deliver emotional support to patients. Just listen to the story. You will be treating the affective and social components of pain.
- 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.