

# The Psychobiology of Pain and Reasons for Holistic Care

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# Conflict of Interest

No financial or other conflict of interest

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# Overview

- What is pain and what are the types of pain?
- What is the impact of chronic pain?
- How do we feel pain?
- Why do people seek mind-body interventions for pain?
- What should we expect from mind-body approaches for pain management?

# What is Pain?

- Pain is an unpleasant *sensory and emotional experience* that is associated with actual or potential tissue damage (IASP 2020)
- By definition pain is a *subjective experience*
- Difficult to measure – you cannot “see” pain
- Yet, it is an important part of the human experience as a **warning signal** to help keep us safe and avoid injury.



# What are the types of pain?

- **Acute Pain** which can be due to injury, inflammation or medical procedures.
  - usually self limiting and resolves in a few minutes, hours, days
- **Chronic pain** is pain that lasts more than several months (defined as 3 to 6 months, but longer than “normal healing”)
  - can be related to disease or inflammation (e.g., arthritis, sickle cell disease)
  - can be a pain condition in the absence of identifiable disease/ inflammation
  - can be *musculoskeletal* (joints and muscles), *neuropathic* (nerve pain), or *visceral* (e.g., abdominal pain)

# The Impact of Chronic Pain

- Chronic pain is a very common problem. Results from the 2012 National Health Interview Survey show that:
- About 25.3 million U.S. adults (11.2 percent) had pain every day for the previous 3 months.
- Nearly 40 million adults (17.6 percent) had severe pain.
- Individuals with severe pain had worse health, used more health care, and had more disability than those with less severe pain. [www.nccih.nih.gov](http://www.nccih.nih.gov)
- Impact on life – reduced ability to work, participate in recreational and social activities, dependence on pain medications/side effects, affects relationships

# Unexplained Chronic Pain

What if pain persists even when disease and inflammation are under control?

Why does this happen??



## The Puzzle of Pain

- Research has shown that pain can persist even when there does not seem to be any injury or obvious source of pain
- People can suffer from diffuse muscle and joint pain without underlying joint inflammation (e.g., fibromyalgia)
- Similarly people with underlying conditions (e.g., arthritis) can develop pain not tied to inflammation
- When there is no obvious sign of disease or injury people may think that maybe the pain is *“in your head”* or *“psychological”*

# How We Feel Pain

- Important to understand the role of the *brain* in feeling pain
- Pain is usually a signal sent to the brain that something is wrong
- Signals picked up by special pain sensing nerves are sent to the brain

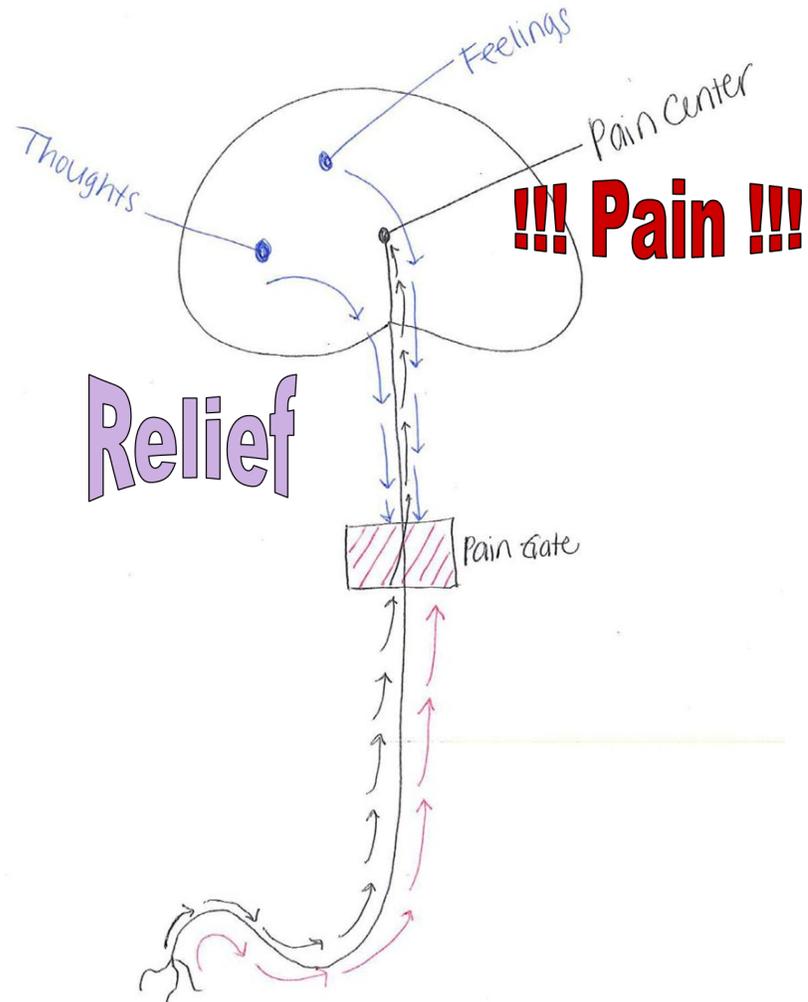


# The Role of the Brain in Pain

- Pain messages are carried by nerves in the body to the brain to process the signal



# Gate Control Theory of Pain



# Pain is a Complex Experience

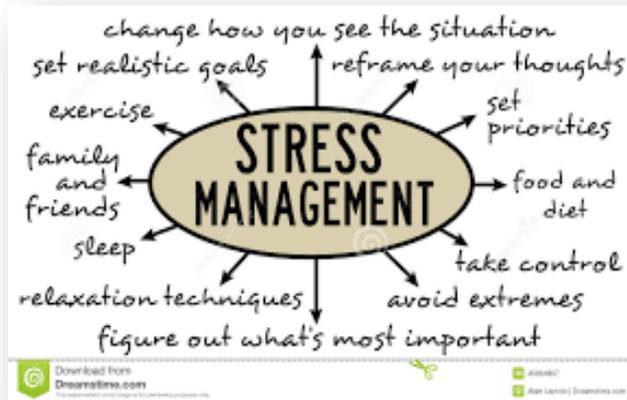
- Pain is a **sensory experience** that is also affected by many other things like our **memories, thoughts and feelings**.
- It is also affected by our **lifestyle** (sleep, exercise, hydration, nutrition)
- Pain sensitivity has a **genetic** component
- Also the body can become “**sensitized**” to pain for many different reasons
- Pain affects people differently – some react to pain more strongly than others

# Biological, Psychological and Social/ Lifestyle Factors that affect the pain experience

- Genetic and biologic factors
  - disease activity, pain sensitivity, neurobiologic, endocrine
- Psychological factors
  - mood, stress, anxiety, history of trauma
- Social and Lifestyle factors
  - family environment, sleep, physical activity, substance use, diet

# A Multi-Modal Approach

- Relying on pain medicine alone is often not the best way to manage pain
- Many research studies have shown that combining treatments is the most effective strategy



## Why do people seek Mind-Body treatments?

- Evidence is increasing for their effectiveness and safety
- They are becoming an important part of integrative medicine approaches for chronic pain management
- Increasing awareness of downsides to long-term use of only medications (side effects, dependence, some medicines may lose effectiveness over time)
- To have a better sense of control over one's life and self-confidence in managing pain

# How Do Mind-Body Techniques Work?

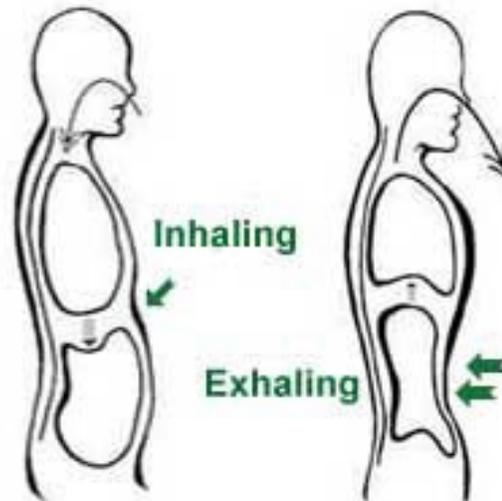
- Mind-body therapies focus on ways to influence the brain and help close the “pain gate”
- By teaching the brain ways to reduce the pain signal by using other areas of the brain
- This can be done through *relaxation, meditation, cognitive-behavioral therapy, distraction, guided imagery, yoga, biofeedback* and other methods
- We know that these tools have actual effects on the brain and body that can reduce how the brain feels pain

Most of these techniques require some training and practice!!

# What is Cognitive Behavioral Therapy (CBT)?

- Well studied approach for pain management
- A training program that usually takes about 6-8 sessions
- Training in a number of mind-body techniques
  - *deep muscle relaxation and breathing relaxation*
  - *guided imagery*
  - *activity pacing*
  - *distraction*
  - *how to deal with negative emotions related to pain*
- Caregivers are trained in “coaching” techniques

# A Simple Example - Deep Breathing



Breathe in slowly through the nose. Hold for 2 seconds, say the word “Relax” in your mind, and then exhale through the mouth or nose. Repeat cycle again. Each time you breathe out feel your body getting a little looser and less tense. Do this 5 times.

# Relaxation and Distraction

**Sight:**

White sand  
with shells

**Taste:**

Salt water



**Hearing:** Roar of waves

**Smell:**

Coconut  
sunscreen

**Touch:**

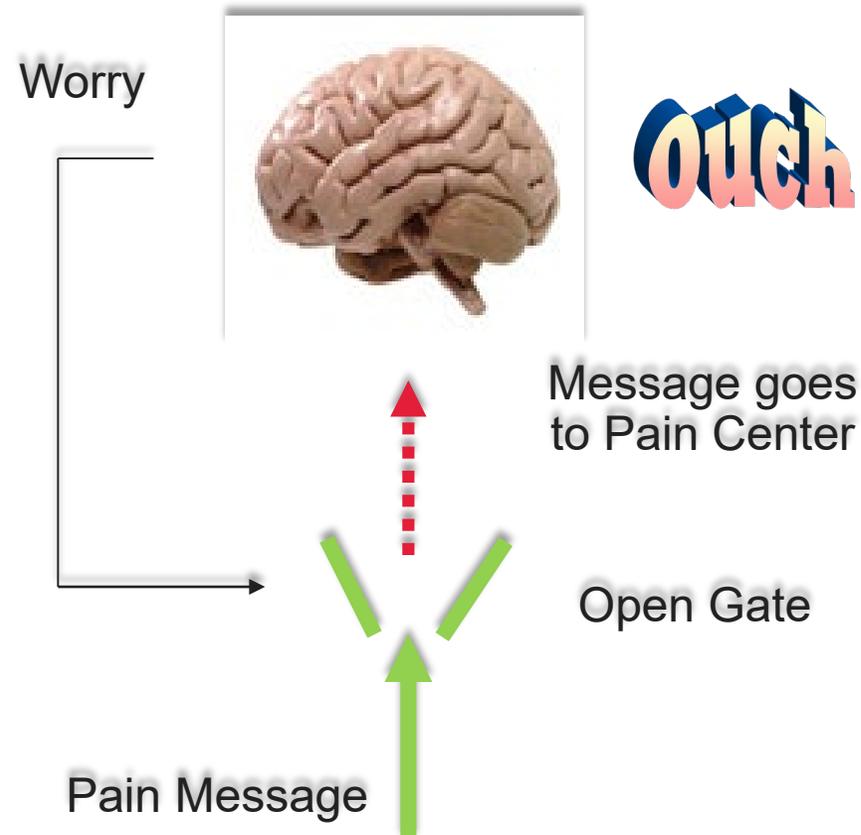
Cool water

Apps on your  
smartphone or tablet!

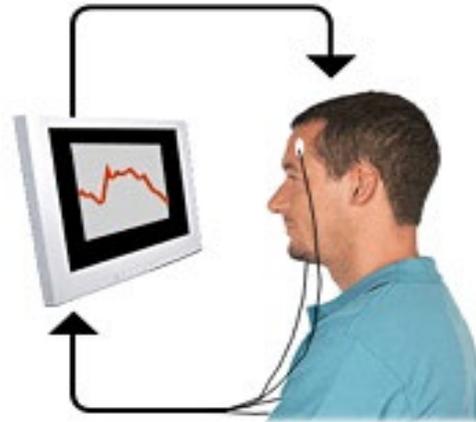
Virtual Reality

# Thinking and the Pain Gate

- Worry and negative thinking result in opening the pain gate and this can amplify pain.
- CBT Teaches ways to reduce worrying thoughts and replace them with calmer thoughts and emotions



# Other Pain Coping Tools - Biofeedback

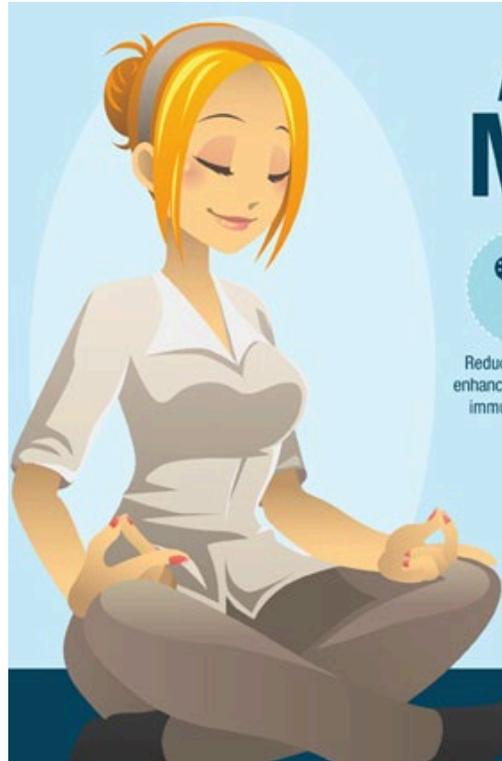


Using computer equipment to monitor body responses, such as muscle tension and surface skin temperature



Immersive  
Virtual Reality with  
Biofeedback

# Meditation & Yoga



## Benefits Of **MEDITATION**

-  Reduces pain and enhances the body's immune system.
-  Reduces feelings of depression, anxiety, anger and confusion.
-  Increases blood flow and slows the heart rate.
-  Provides a sense of calm, peace and balance.
-  Helps reverse heart disease.
-  Helps control thoughts.
-  Increases energy.
-  Reduces stress.



## Effects of Mind-Body techniques

- There was evidence in a 2017 review paper that ***acupuncture, yoga, relaxation techniques, tai chi, massage, and osteopathic or spinal manipulation*** may have some benefit for chronic pain
- for ***acupuncture*** there was evidence that the technique could reduce a patient's need for opioids.
- ***Hypnosis*** can be moderately effective but effects can vary in individuals
- ***Mindfulness meditation*** has been found to have small effects
- Recent interest in studying ***music*** as a therapeutic tool – promising initial work

## Setting realistic expectations

- Seeking a **cure** versus seeking **better control** over pain and getting your life back
- A focus on **function**, coping and quality of life and **returning to valued life activities**
- not a magic pill- Most techniques require **several sessions**
- Some require putting in **effort** and **regular practice!**

Healthy Mind + Healthy Body = Improved Pain Management

# Thank you!



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