Evidence-Based Pain Management: Interventions, Approaches, and Best Practices

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Pain

- Pain management is a difficult and expensive challenge for our healthcare system.
- Annually, the cost of pain management is estimated to be in the $560 billion to $635 billion range, exceeding the cost of heart disease, cancer, and diabetes (Zah et al., 2019).
- Pain has been cited as the most common reason Americans access the healthcare system.

Caring for Patients with Pain

- Matthias (2010) designed a study to elicit providers' perspectives on caring for patients with chronic pain. Three themes emerged:
  - The patient-provider relationship is important to good pain care.
  - Difficulties in caring for patients with chronic pain include pressure to prescribe opioids, believability of patients' reports of pain, worries about secondary gain, and "abusive" or "difficult" patients.
  - Providers describe the emotional toll, including feeling frustrated, ungratified, and burned out.

Defining Pain

- The International Association for the Study of Pain (IASP) defines pain as:
  - “[A]n unpleasant sensory and emotional experience associated with actual or potential tissue damage.”

- The IASP also states:
  - Pain is always subjective.
  - Individuals learn to apply the word pain through experiences of injury in early life.
  - Because pain is unpleasant, it is also an emotional experience.

More Definitions

- Chronic pain
  - Persistent or recurrent pain lasting longer than 3 months or pain present on at least half the days during the past 6 months

- Nociceptive pain
  - Pain comparable to injury/pathology and proportional to mechanical/anatomical symptom characteristics
  - Resolution congruent with anticipated healing time
  - Pain description typically intermittent and sharp with movement/mechanical aggravation
  - Pain involving additional symptoms of inflammation, such as redness and swelling (Hawk et al., 2020)

Another Definition

- Central sensitization
  - Pain is out of proportion to the severity of the associated injury or disease.
  - Pain distribution is variable and/or diffuse. It is not anatomically congruent with accompanying allodynia (pain from stimuli that would normally not cause pain) and hyperalgesia (pain that is more severe than normal).
  - There is hypersensitivity to stimuli such as light, temperature, stress, and emotions.

Better Pain Management

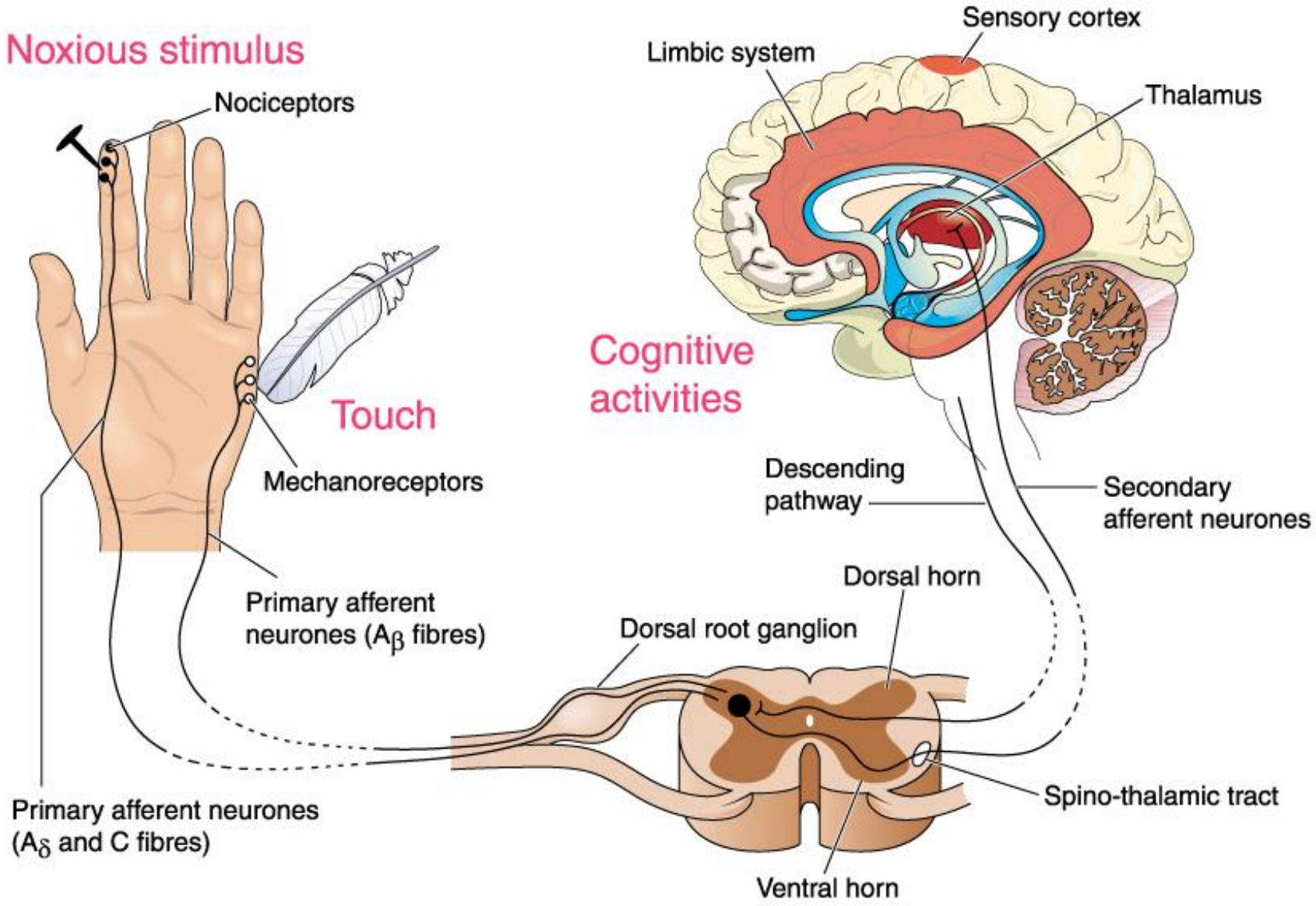
- Due in part to the opioid epidemic, there has been a shift in preferred pain management practices from pharmacological management to **nonpharmacological** and **self-management** approaches.

- An article in the *Journal of Family Practice* (2018) outlined the following evidence-based treatment approaches:
  - Exercise-based therapies
  - Mind-body therapies (mindfulness, cognitive-behavioral therapy)
  - Complementary modalities

Pain Models

- Old = biomedical model
  - Structural conceptualization of pain
  - Goal is to find the source of pain (imaging) and treat it by targeting faulty tissues
  - The amount of pain an individual experiences is directly proportional to the degree of injury

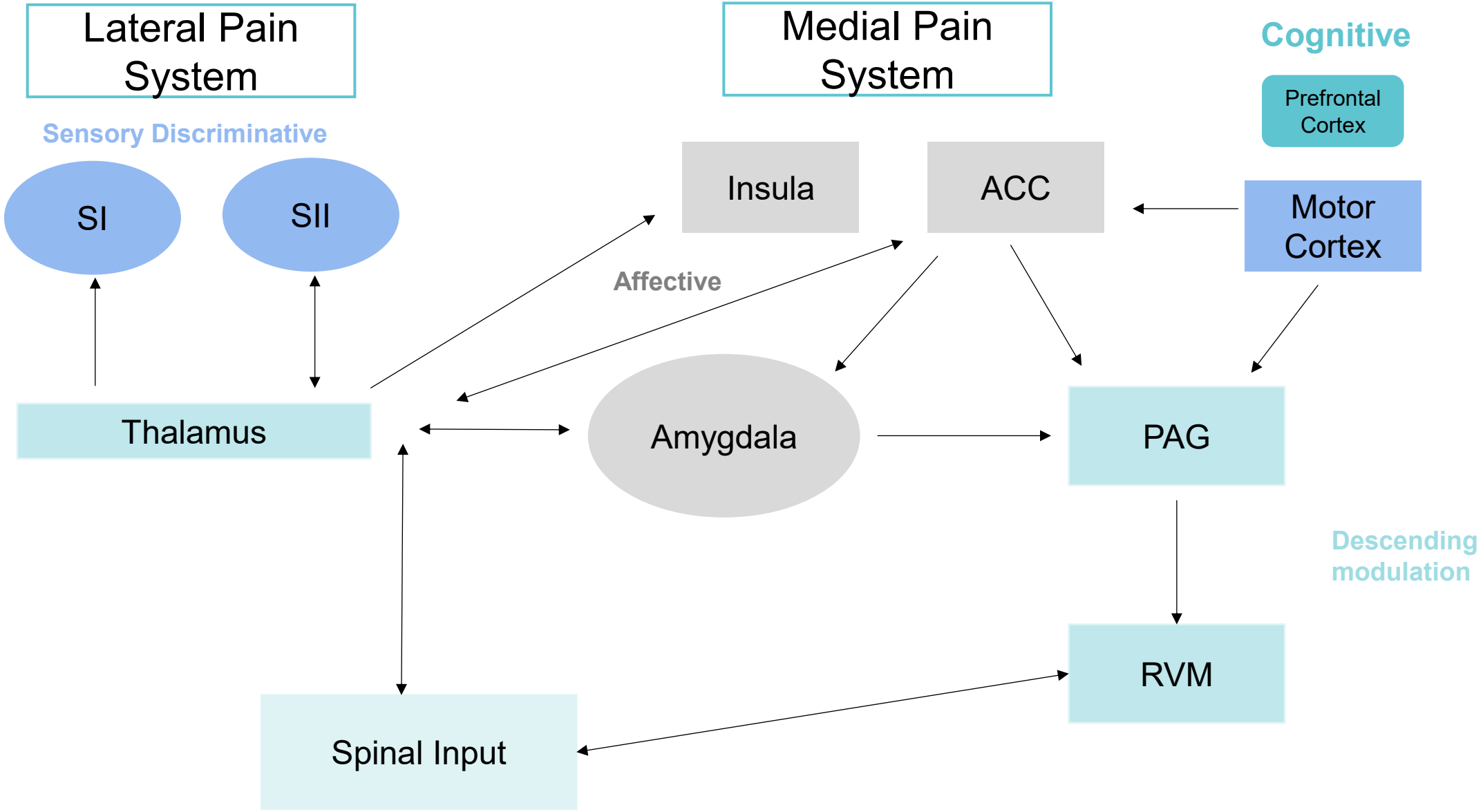
Pain Sensations



Pain Models

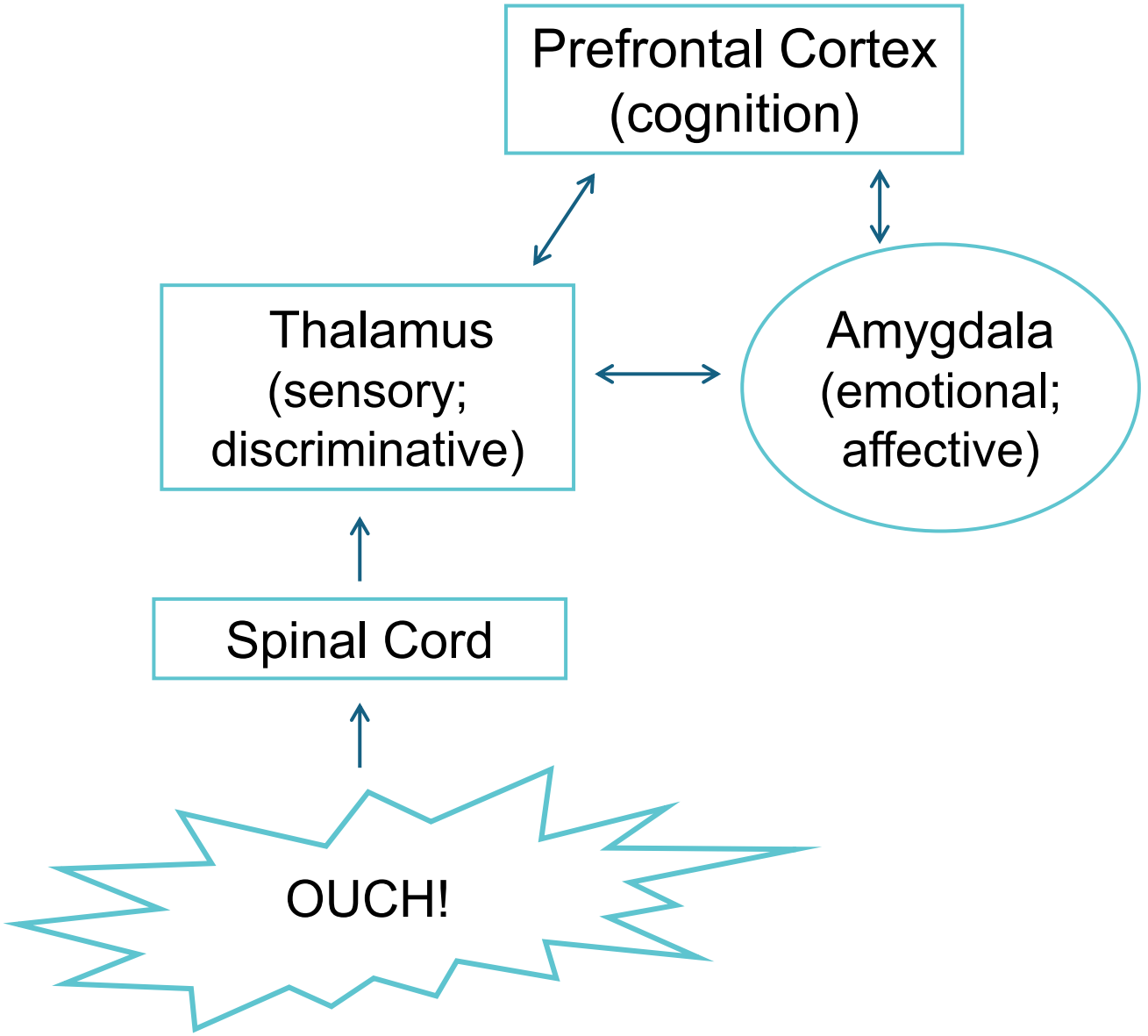
- New = biopsychosocial model (proposed by Engel [1977])
  - Along with biological factors, psychological factors (beliefs, distress, anxiety, fear) and social factors (finances, family, work issues) are associated with pain perception

Pain Models



Adapted from Khera & Rangasamy, 2021

Pain Models


Prefrontal Cortex
(cognition)
Thalamus
(sensory;
discriminative)
Amygdala
(emotional;
affective)
Spinal Cord
OUCH!

Pain Input

- Understand that pain is not related to the health of a specific tissue but to neural input from multiple structures.
  - Sensory system: Detects where pain is coming from
  - Movement: Coordinates and executes movements related to protection mode
  - Focus and concentration: Engaged in dealing with pain
  - Fear: On high alert, especially if pain is not well understood
  - Memory: Remembering previous pain experiences and the strategies used to deal with them
  - Motivation: Areas dealing with motivation are used to process pain instead
  - Stress: Stress areas that control sleep and appetite are activated

Pain Input

- Understand that pain is not related to the health of a specific tissue but to neural input from multiple structures.
  - ***After input from all these areas, the brain produces pain.***

In Other Words …

> “What a patient thinks, feels, and believes about his or her condition will significantly impact their examination, treatment, and prognosis” (Louw, 2018, p. 6).

Pain Assessment

- A comprehensive pain assessment should determine the following.
  - Onset: Mechanism of injury or etiology of pain, if identifiable
  - Location/distribution
  - Duration
  - Course or temporal pattern
  - Character and quality of the pain
  - Aggravating/provoking factors
  - Alleviating factors
  - Associated symptoms
  - Severity: Intensity or impact on function, sleep, mood (Kishner, 2022)

Red Flags

- A specific sign or cluster of symptoms that should raise suspicion for a serious pathology (Bourassa et al., 2023)

Red Flags

- Key red flags to look for in pain assessment:
  - **History of cancer:** Particularly a concern if the pain is in the back or is accompanied by unexplained weight loss
  - **Recent trauma or significant injury:** Major trauma could indicate a fracture or spinal cord damage
  - **Unexplained weight loss:** A significant drop in weight without dietary changes could signal a serious underlying condition.
  - **Fever:** The presence of fever with pain could suggest an infection.
  - **Night pain:** Pain that is significantly worse at night can be a red flag.
  - **Neurological symptoms:** Numbness, tingling, weakness, or loss of bowel/bladder control, especially if localized to a specific area

Red Flags

- **Saddle anesthesia:** Numbness in the "saddle" area (between the legs and buttocks) can indicate a spinal cord compression
- **Severe or rapidly progressive neurological deficits:** Sudden worsening of neurological function like weakness or loss of sensation
- **Intense localized pain:** Pain that is severe and localized to a specific area, especially if accompanied by other red flags
- **Pain that worsens with coughing or straining:** This could indicate a spinal issue.

Red Flags

- **History of steroid use:** Long-term use of steroids can weaken bones and increase the risk of fractures.
- **IV drug use:** Injection drug use can increase the risk of infections and spinal complications.
- **Advanced age and new-onset pain:** Older patients with sudden-onset severe pain should be carefully evaluated.

Orange Flags

- Psychiatric symptoms
  - Depression
  - Anxiety
  - Personality disorder

Screening for Yellow Flags

- Best practice is to screen for yellow flags when completing pain assessments.

- One well-regarded tool is the Optimal Screening for Prediction of Referral and Outcome Yellow Flag tool (OSPRO-YF).

Screening for Yellow Flags

- Why use a screening tool?
  - Gain insight about your client's status
  - Minimize risk for overuse of healthcare services

- What to do with the information gained?
  - Stearns and colleagues (2021) outlined a framework for incorporating yellow flag screening into clinical practice.

Yellow Flags

- Yellow flags are psychological factors that can increase the likelihood of poorer outcomes, chronic pain, and disability.

- Beliefs, appraisals, and judgements
  - Unhelpful beliefs about pain; seeing the injury as uncontrollable or likely to worsen; expectation of poor treatment outcome

Yellow Flags

- Emotional responses
  - Worry, fears, anxiety

- Pain behavior
  - Avoidance of activities due to expectations of pain and possible reinjury
  - Overreliance on passive treatments (Physiopedia, 2023)

Screening for Yellow Flags

- **Step 1: Establish a screening process**
  - Select a screening tool
    - One-dimensional tools focus on detailed information in one area but lack breadth.
      - Pain Catastrophizing Scale
      - Pain Self-Efficacy Questionnaire
      - Fear-Avoidance Beliefs Questionnaire
    - Multidimensional tools evaluate multiple dimensions but lack depth.
      - OSPRO-YF
      - Orebro Musculoskeletal Pain Questionnaire

Screening for Yellow Flags

- Decide which patients to screen
  - Screening all patients increases accuracy in identifying patients with psychological distress versus relying only on patient interactions
    - Information gained can be used to improve therapeutic rapport
    - Drawback is increased administrative burden
  - Screening select patient groups
    - No improvement after a period of standard care
    - Less burdensome
    - Risk of providing care that is less effective
- Decide when to reassess

Screening for Yellow Flags

- **Step 2: Shared decision making**
  - Engage clients in discussions about yellow flag screening results
  - Can feel daunting and is a skill that can/should be developed
  - Information should be shared in a patient-centered manner

Screening for Yellow Flags

- **Step 2: Shared decision making**
  - Examples
    - Screening
      - “This is a screening tool that will help us know more about how pain is affecting you, which will help us design the most appropriate treatment plan.”
      - “We want to understand your personal experience with pain and the thoughts, feelings, and behaviors it is causing.”
      - “We ask everyone these questions so that we can arrive at the best treatment plan.”

Screening for Yellow Flags

- Reviewing results
  - “I can see that pain is affecting you in many ways. That is understandable because pain is complex.”
  - “Your answers help identify things that are important to consider in your treatment plan.”

- Discussing referral options
  - “What are your thoughts about a provider who specializes in how you think and cope with pain, in addition to participating in treatment?”
  - “Pain affects so many areas of your life, and engaging other providers can increase the likelihood that you will achieve your goals.”

Screening for Yellow Flags

- Addressing specific results
  - “I know you are concerned about how movement and activity affect your pain. Starting gradually, we will work together to increase your motion and activity in order to improve your function.”
  - “I can see it has been challenging to cope with pain. We can work together to find strategies to improve your coping skills so that you can meet your goals.”

Screening for Yellow Flags

- Stratified treatment approaches based on impact of yellow flags
  - Low impact of yellow flags with no symptoms of mental illness
    - Plan of care: Standard
      - Self-management
      - Encouragement
      - Advice to remain active
  - Moderate influence of yellow flags with no symptoms of mental illness
    - Plan of care
      - Cognitive-behavioral strategies
      - Coping skills
      - Motivational interviewing
      - Self-management

Screening for Yellow Flags

- Moderate or high impact of yellow flags with symptoms of mental illness
  - Plan of care
    - Referral and communication with appropriate providers
    - Cognitive-behavioral strategies
    - Coping skills
    - Motivational Interviewing
    - Self-management

Research

Cognitive Influences

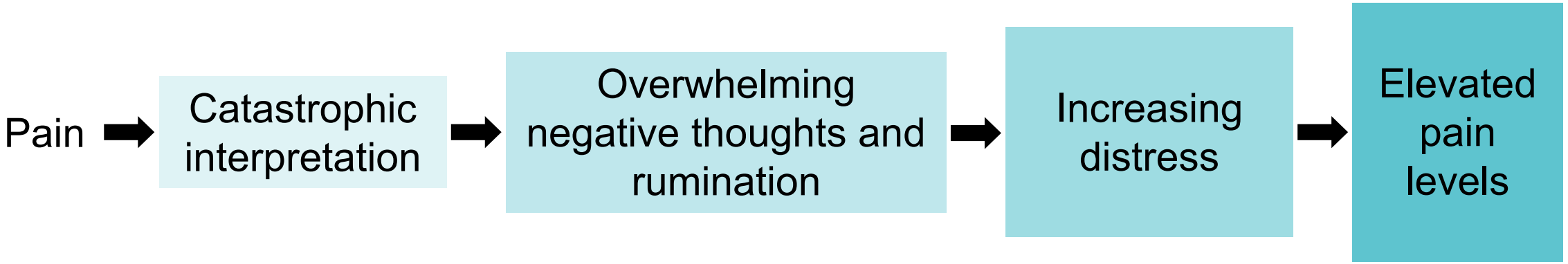
- Pain catastrophizing
- Attention
- Coping strategies
- Self-efficacy

Pain Catastrophizing

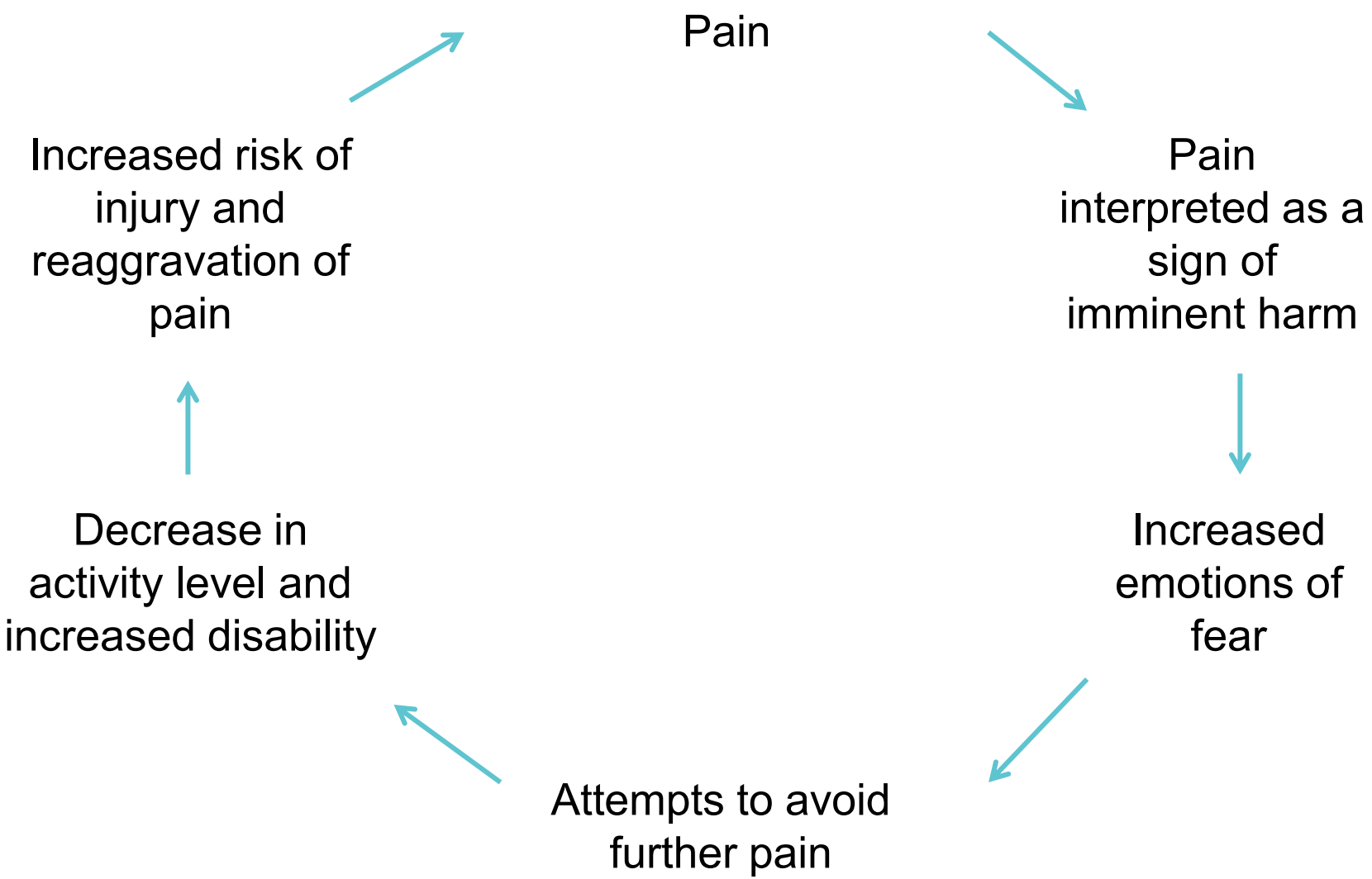
- Pain catastrophizing
  - A set of exaggerated and negative thoughts and emotions that influence the perception of actual or anticipated painful stimulation (Quartana et al., 2009)

- Also
  - Magnification of the threat value of pain
  - Feelings of helplessness and/or a lack of control over the experience of pain (Simic et al., 2024)

Cognitive-Behavioral Theory



Fear-Avoidance



Neurobiology and Catastrophizing

- Evolving research
- Connections with serotonin levels
- Increase in inflammatory markers (neuroinflammation)
- Genetic differences in pain processing (brain-derived neurotrophic factor)

Neurobiology and Catastrophizing

- Increased activity in the anterior cingulate cortex, which plays a role in emotional processing and pain modulation

- Prefrontal cortex implicated (Simic et al., 2024)

Measuring Pain Catastrophizing

- The Pain Catastrophising Scale (PCS) can be used to assess pain catastrophizing
  - 13 items
  - 3 domains
  - 5-point Likert scale
  - Example: “I worry all the time about whether the pain will end (Kardash et al., 2024)”

Attention

- Selective attention to pain-related stimuli can amplify pain perception intensity

- Distraction can mitigate pain perception by diverting attention away from the pain (Chayadi & McConnell, 2019; Simic et al., 2024)

Coping Strategies

- Thoughts and activities that influence pain perception

- Maladaptive pain coping strategies
  - Increasing use of pain meds
  - Avoiding activity to reduce pain
  - Catastrophizing

Adaptive Pain Coping Strategies

- Behavioral
  - Relaxation
  - Pacing
  - Engaging in pleasant activities

- Cognitive
  - Distraction
  - Identifying catastrophizing thoughts and replacing them with positive coping thoughts

Self-Efficacy

- Definition: A person's confidence to perform tasks in the face of obstacles
- In the context of pain: A person's confidence in managing pain and persisting despite their pain
- Lower pain self-efficacy is linked with higher pain and with higher rates of pain-related depression

Self-Efficacy

- Pain Self-Efficacy Questionnaire (PSEQ) can be used to assess pain self-efficacy
  - 10 items
  - Confidence rated on a 7-point Likert scale
  - Example: “I enjoy things, despite the pain (Kardash et al., 2024)”

Emotional Influences

- Depression
- Anxiety
- Fear, worry, and helplessness/hopelessness

Depression

- Strong positive relationship between chronic pain and depression
- Relationship is reciprocal
- Individuals being treated for chronic pain who also have depressive symptoms are more likely to have poor outcomes (higher pain severity, poorer quality of life, higher functional impairment)

Assessing Depression

- Depression subscale of the Depression Anxiety Stress Scale
  - 7 items with 4-point Likert scale (0 = never, 3 = almost always)
  - Example
    - “I feel that life is meaningless (Kardash et al., 2024)

- PHQ-9
  - 9 items where symptoms are scored by frequency ranging from “Not at all” to “Nearly every day”
  - Example
    - “Little interest or pleasure in doing things” (Levis et al., 2020).

Anxiety

- A study by Burston and colleagues (2018) found that higher anxiety scores are significantly associated with higher pain sensitivity in patients with knee osteoarthritis (OA).

- De La Rosa and colleagues (2023) found that unremitted anxiety (and/or depressions) symptoms are 5 times more common in those with chronic pain than in those without chronic pain.

- Measuring anxiety
  - Generalized Anxiety Disorder (GAD-7)
    - 7 items with Likert scale ranging from 0 (not at all) to 3 (almost every day)

Fear, Worry, Helplessness

- Can trigger activation of the sympathetic nervous system (fight or flight)

- Correlates with insomnia
  - Strong relationship between poor sleep and pain-related disability
  - Association between fatigue and pain-related disability

Social Factors

- A shared neural pathway between “social pain” and physical pain
  (Sturgeon & Zautra, 2016)
  - Early life trauma
  - Work stress/job dissatisfaction; compensation issues
  - Pain-related injustice
  - Isolation; lack of social support

Early Life Trauma

- Adverse childhood experiences (ACEs) are associated with adult chronic pain.

- Emerging evidence has established the neurobiological underpinnings of this association
  - Changes in genetic expression that affect brain structure and function
  - Heightened pain sensitivity
  - Flattened cortisol profile in adults, which predicts elevated daily pain and emotional symptoms

Pain-Related Injustice

- Characterized by negative appraisals of pain-related loss and unfairness

- Fosters hypervigilance toward pain and elevated pain levels (Landmark et al., 2024)

Social Support

- Social support can mitigate the effects of chronic pain.
- However, considerable evidence demonstrates that increased levels of concern and attention from others in response to pain behaviors predict an increase in pain-related disability.
- Support that lacks solicitous responses to pain is likely most beneficial (Meints & Edwards, 2018).

Clinician Tools

- Cognitive-behavioral therapy
- Coping skills
- Motivational interviewing

Cognitive-Behavioral Therapy

- Focused on decreasing maladaptive responses like catastrophizing and pain-related fear
- Promotes self-efficacy
- Shown to reduce disability but not pain intensity (Landmark et al., 2024)

CBT: Pacing

- Interrupts fear-avoidance cycle
- Educate on how fear avoidance can lead to increased pain and disability
- Maladaptive habits
  - Doing things when you feel like it
  - Overdoing it on good days
  - Resting for long periods of time
  - Doing jobs all in one go

Pacing

- Adaptive habits

- Key elements
  - Take frequent short breaks
  - Gradually increase the amount being done
  - Break up tasks into smaller parts (West Suffolk NHS Foundation Trust, 2021)
  - Be consistent and persistent
  - Normalize “bad” days

CBT: Thoughts

- Education on contribution of maladaptive thinking to pain
- Identification of maladaptive thinking
- Replacement of maladaptive thoughts with coping/adaptive thoughts
  - “When your pain flared up yesterday, what thoughts did you have about your pain/situation?”
  - Look for “never” and “always” statements
    - “I am never going to be able to do what I did before”
    - “I’m always going to be crippled by pain”

Coping Skills

- Relaxation
  - A systematic review of studies evaluating the effect of relaxation on chronic pain showed that most of the studies reported relaxation reduced pain and/or secondary outcomes.
  - Effectiveness is improved with regular and continued practice.
  - Techniques
    - Deep breathing exercises
    - Deep breathing activates the body's relaxation response, slowing down the heart and lowering blood pressure
    - Progressive muscle relaxation
      - Systematically tensing and relaxing muscle groups
    - Guided imagery
      - Focuses on posting mental images, engaging the senses

Mindfulness

- Focus on the present
- Increase awareness and acceptance
- Shown to improve pain interference, improve acceptance, reduce catastrophizing, and reduce pain (Pardos-Gascon et al., 2021)

Distraction

- The goal is to divert attention away from the noxious stimuli.
- Some studies have found that distraction leads to pain relief, but others have found no effect.
- Brain imaging shows that cognitive and emotional activities/states change afferent pain pathway activities.

Distraction

- Distractive activities engage the primary somatosensory cortex, the insula for cognitive activities, and the anterior cingulate cortex (ACC) for emotional activities.

- Pain stimuli are processed in similar regions in the brain.

Distraction

- Cognitive strategies
  - Engage in cognitive activities that draw attention away from pain
    - Puzzles, sudoku, crosswords

Distraction

- Emotional strategies (distraction versus numbing)
  - Pleasure
    - Engage in activities that are pleasant
  - Social
    - Spend time with supportive, engaging people (Asafi Rad & Wippert, 2024)
  - Negative emotional strategies
    - Phone/computer/TV
    - Shopping/gambling
    - Alcohol

Motivational Interviewing

- A communication skill that helps clients develop their own motivation for engaging in self-management strategies, adhering to treatment plans, and changing maladaptive pain-related behavior(s)

- Accomplished while respecting an individual's autonomy and fostering a collaborative relationship

Motivational Interviewing

- Exploratory
  - Discover reasons to change
    - “If you did not have this pain, how would your life be different?”

- Empathic
  - Affirms how pain has changed their life
    - “I can see that this injury has changed how you spend your time.”

Motivational Interviewing

- Empowering
  - Recognize strengths
    - Resources available to help with change (people, interests, etc.)
  - Elicit their initiative to change
    - “How would your life be better/different if…”

Best Practice Nursing and Pain Management

- Standards of care
  - Acknowledging and accepting patient's pain
  - Identifying most likely cause of patient's pain
  - Assessment
  - Aggressive treatment of side effects
  - Education
  - Evaluating effectiveness of strategies and interventions
  - Documentation
  - Advocacy

Best Practice Occupational Therapy and Pain Management

- Goal is to enable individuals with pain to participate in meaningful activities despite their pain
- Educate client and family about the neuroscience of pain and role of cognition, emotions, depression, and so on
- Specific strategies
  - Establish or restore daily structure
    - Hour by hour
    - Day by day

Best Practice Occupational Therapy and Pain Management

- Specific strategies
  - Adaptive equipment and environmental modifications
  - Pacing and graded exposure to activity/movement
  - Relaxation
  - Education on body mechanics and ergonomics
    - Task simplification
    - Joint protection
  - Energy conservation techniques

Best Practices and Physical Therapy

- Exercise and movement
- Physical agents

Physical Activity and Exercises

- Physical activity and exercises have been shown to improve pain intensity, physical function, mental health outcomes, and quality of life in individuals with chronic pain.
- Benefits depend on long-term adherence and behavior change.
- Exercise recommendations/prescriptions should be collaborative (Zader et al., 2020).

Exercise Participation Strategies

- Strategies used by persons with chronic pain to increase participation in physical activity
  - Engaging in self-talk
    - Pre-excuse proof your physical activity
  - Focusing on what you do, not what you cannot do
  - Setting a goal
  - Prioritizing
  - Adapting and modifying
  - Choosing enjoyable, low-impact activities (Zader et al., 2020)

Exercise Prescription

- There is increasing evidence supporting the use of exercise as a first-line therapy for treatment of nearly all forms of chronic pain.

- Proposed mechanisms of exercise-induced hypoalgesia include the following.
  - Reduction of anti-inflammatory cytokines
  - Regulation of neurotransmitter release
  - Cortical reorganization (Pontes-Silva et al., 2023)

Exercise Prescription

- An exercise prescription can be challenging, as there is limited evidence delineating optimal exercise dosage.

- Exercise prescriptions should address:
  - Intensity
  - Frequency
  - Duration

Exercise Prescription

- Intensity
  - Low to moderate-intensity exercises (50% to 60% of max heart rate) has been shown to be sufficient to improve chronic pain symptoms (with greater benefits if higher intensity exercise is tolerated;). (Polaski et al., 2019)

- Frequency
  - A study by Fjeld and colleagues (2023) found that the absolute prevalence of chronic pain was highest among those who never exercise and lowest among those who exercise nearly every day.
  - A frequency of two to three times per week is the recommended minimum.

Exercise Prescription

- Duration
  - An inverse relationship has been found between exercise duration (minutes per day) and level of chronic pain (Fjeld et al., 2023).
  - The American College of Sports Medicine recommends 30 minutes of moderate-intensity exercise 5 days per week for healthy adults (Polaski et al., 2019).

- Barriers
  - Fear-avoidance beliefs
  - Self-efficacy
  - Motivation

Strength Training

- Muscle contraction can cause pain, and greater strength training intensity can elicit an increase in pain sensations (Pontes-Silva et al., 2023).

- Consequently, strength training requires careful consideration of:
  - Posture and biomechanics (joint compression, distraction)
  - Muscle length/strength relationships
  - Range of motion
  - Proximal stability

Strength Training and Chronic Pain

- Strength directly affects functional ability.
- Weakness is common in persons with chronic pain.
- Optimal intensity, volume, and frequency for strength training remain ill-defined.
- Key guiding principles:
  - Start with low intensity
  - Progress gradually (Maestre-Cascales et al., 2023)

Exercise Guidelines

- Chronic pain patients may be more successful when they self-select a lower exercise intensity than recommended standards.
- Any movement, no matter how minimal, is desirable.
- Safety precautions to reduce injury risk.
- Proper posture and body mechanics to reduce aberrant joint loading.
- “Start low, go slow.”

Physical Agents

- Carefully consider use of passive treatment

- Physical agents
  - Cold/heat
  - transcutaneous electrical stimulation (TENS)
  - Electric stimulation/Interferential Current (IFC)
  - Laser

Cryotherapy and Pain Management

- Cryotherapy: The application of a cold source with the goal of decreasing tissue temperature

- Multiple sources: Ice bags, cold packs, continuous flow devices, and so on.

- Physiological effects:
  - Decreased tissue edema
  - Decreased microvascular permeability
  - Decreased inflammatory mediators
  - Vasoconstriction with reduced blood flow
  - Decreased metabolic demand
  - Decreased nerve conduction velocity

Cryotherapy and Pain Management

- Net effect: Increased pain tolerance
- Recommended strongly for acute musculoskeletal injury and postsurgical pain (Hsu et al., 2019)

Cryotherapy and Chronic Pain

- Peripherally, cryotherapy inhibits peripheral sensitization and nociceptive signal transmission.
- It may also mitigate central sensitization by reducing membrane excitability, presynaptic transmitter release, and signal propagation.
- EEG studies show that cryotherapy enhances alpha and beta wave rhythms, which may impact cognitive and attentional pain modulation (Shi & Wu, 2023).

Heat and Chronic Pain

- Peripherally, heat therapy increases blood flow and relaxes muscles.
- Neuroimaging studies have shown central effects.
  - Activation of endogenous opioid systems
  - Activation of serotonergic systems
  - Both systems involved in analgesia by improving connectivity between the thalamus, anterior cingulate cortex, and periaqueductal gray
- Evidence suggests heat therapy reduces central sensitization markers (neuroinflammation and NMDA receptor activation) (Shi & Wu, 2023)

Heat and Ice as Adjunct Therapies

- As adjunct therapies, heat and cold can:
  - Increase tolerance for activity and exercise
  - Disrupt the fear-avoidance cycle
  - Improve self-efficacy

TENS and Pain

- TENS involves application of low-intensity electrical stimulation.

- Affects the nervous system at multiple levels:
  - Peripherally inhibits nociceptive transmission
  - In the spinal cord, suppresses dorsal horn activity
  - In the brain, alters activity and connectivity between the thalamus, somatosensory cortex, anterior cingulate cortex, insula, prefrontal cortex, and periaqueductal gray, suggesting effects on sensory, cognitive, and affective dimensions of pain (Shi & Wu, 2023)

TENS and Pain

- Recommended as part of a multimodal approach to pain
- Use during exercise has been shown to be effective in allowing for increased exercise participation with decreased pain

Ultrasound and Pain

- Ultrasound uses high-frequency sound waves to promote tissue healing.

- Postulated mechanisms of effectiveness:
  - Activates descending inhibitory pathways
  - Modulates neurotransmitters and neuropeptides
  - Reduces inflammation and central sensitization
  - Stimulates tissue regeneration
  - Long-term effectiveness undetermined (Shi & Wu, 2023)

Ultrasound and Pain

- Best practice
  - Use judiciously in conjunction with other therapies – NOT stand alone
  - Remember it is a passive modality

Interferential Current (IFC/IC) and Pain

- Interferential current is an alternating medium-frequency current.
- Frequency ranges are from 1 to 10 kHz.
- In theory, medium frequency is able to reduce the skin's impedance, allowing for less patient discomfort and greater tissue penetration.
- Low-quality evidence suggests IFC is superior to TENS in pain relief.
- Can be used posttreatment to decrease exercise-related pain (Rampazo et al., 2023).

Laser Therapy and Pain Management

- Laser therapy uses light to stimulate biochemical reactions in cells.
- Laser therapy can be classified as low-level laser therapy (LLLT) or high-level laser therapy (HILT) based on emission power.
- LLLT is a-thermal and superficial in its effects (3 to 4 cm).
- HILT is thermal and can reach 10 to 12 cm.
- Dosing recommendations exist for LLLT therapy, but HILT is a recent resource, and recommendations have not been established (de la Barra Ortiz et al., 2023)

Laser Therapy and Pain Management

- LLLT has been shown to be effective for pain relief.
- LLLT has few side effects and is well tolerated.
- However, it should be used only in combination with other active pain management interventions (Cotler et al., 2015).
- Recent evidence suggests that HILT may be more effective than LLLT for decreasing pain and promoting tissue healing (Wu et al., 2022).

Case Study: Managing Chronic Low Back Pain. A Biopsychosocial Approach

- **Patient profile:**
  - Sarah Johnson is a 45-year-old administrative assistant who presents with a 9-month history of low back pain following a workplace injury where she slipped and fell. She initially received traditional physical therapy and medication management but reports minimal improvement. She has been out of work for the past 3 months due to pain.

Case Study: Managing Chronic Low Back Pain. A Biopsychosocial Approach *(continued)*

- **Subjective Information**
  - Pain location: Lower back with occasional radiation to left buttock
  - Pain intensity: 7/10 at worst, 4/10 at best
  - Aggravating factors: Prolonged sitting, bending, lifting
  - Alleviating factors: Rest, heat
  - Sleep: Disrupted due to pain
  - Prior treatments: Physical therapy (6 sessions), NSAIDs, muscle relaxants
  - Current activity level: Significantly decreased from preinjury

Case Study: Managing Chronic Low Back Pain. A Biopsychosocial Approach *(continued)*

- **Psychosocial Assessment**
  - PHQ-9 score: 14 (moderate depression)
  - Pain Catastrophizing Scale: 32 (high catastrophizing)
  - Fear-Avoidance Beliefs Questionnaire: High scores for both work and physical activity
  - Social factors: Lives alone, limited social support, worries about job security
  - Beliefs about condition: "I'll never get better," "Movement will make it worse"

Case Study: Managing Chronic Low Back Pain. A Biopsychosocial Approach *(continued)*

- **Physical Examination**
  - Decreased lumbar range of motion in all planes
  - Negative straight leg raise
  - No red flags identified
  - Generalized weakness in core and lower extremity muscles
  - Guarded movement patterns
  - Normal neurological examination

Case Study: Managing Chronic Low Back Pain. A Biopsychosocial Approach *(continued)*

- **Discussion Points**
  1. What yellow flags can you identify in this case?
  2. How would you explain pain neuroscience education to Sarah?
  3. Develop a comprehensive treatment plan incorporating:
     - Physical interventions
     - Psychological approaches
     - Social support strategies

Case Study: Managing Chronic Low Back Pain. A Biopsychosocial Approach *(continued)*

- **Discussion Points** *(continued)*
  4. What outcome measures would you use to track progress?
  5. How would you address Sarah's fear of movement?
  6. What would be appropriate exercise progression?
  7. How would you incorporate CBT principles into treatment?
  8. What role might physical agents play in treatment?

Case Study: Managing Chronic Low Back Pain. A Biopsychosocial Approach *(continued)*

- **Treatment Goals**
  1. Reduce pain catastrophizing
  2. Improve pain self-efficacy
  3. Increase functional activity tolerance
  4. Return to work with modifications
  5. Develop sustainable self-management strategies

Summary

- Addressing pain is a major part of what we do.
- Pain should be understood in all its complexity.
- Cognitive, social, and emotional factors contribute to pain perception.
- Clinicians should incorporate this understanding into their understanding of their patients and their plans of care.
- Pain management should adhere to evidence-based and discipline-specific best practice.

You have completed the course:

Evidence-Based Pain Management: Interventions, Approaches, and Best Practices

Thank you!