

## Preventing Pain: An Introduction

Pain is defined by IASP as “An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.” Chronic pain is typically defined as pain that continues to be present for greater than 3 months [15], or lasts longer than the expected normal duration of recovery. Monitoring an individual’s pain that does not improve within 3 months is important given that early treatment of pain is the best way to prevent long-term, persistent chronic pain [7].

An estimated 1 in 5 people in the world population experiences some form of chronic pain [8]. In the United States alone, 50 million people suffer from chronic daily pain with 19.6 million have high-impact chronic pain (i.e., chronic pain that frequently limits life or work activities) [2]. The most common types of chronic pain include:

- musculoskeletal pain (e.g., chronic low back pain, neck pain, arthritis pain)
- neuropathic pain (e.g., peripheral neuropathy, trigeminal neuralgia)
- functional pain syndromes (e.g., fibromyalgia, chronic migraine, chronic pelvic pain)
- chronic pain after surgery
- complex regional pain syndrome
- cancer pain

### Impact of Chronic Pain

Chronic pain represents a great burden on the global society as well as the individual. The whole person and their environment are impacted by chronic pain – physically, psychologically, behaviorally, and socially [6]. The personal impact of chronic pain on a person’s life depends on the severity and duration of pain and how well the individual is able to manage their pain. Chronic pain can lead to reduced activity and social isolation [3]. While it may seem like avoiding activities such as exercise and social events would allow rest and healing, scientific data show that gentle to moderate activity and continued engagement in a healthy range of daily activities is best for prevention and management of chronic pain [11].

### How Pain Transitions from Acute to Chronic Pain

A variety of physical, genetic, environmental, psychological, and social factors interact with pathophysiology to contribute to the transition from acute pain into chronic pain. It is unknown, however, what the specific contributors are for individual cases of acute pain although psychosocial factors are significant.

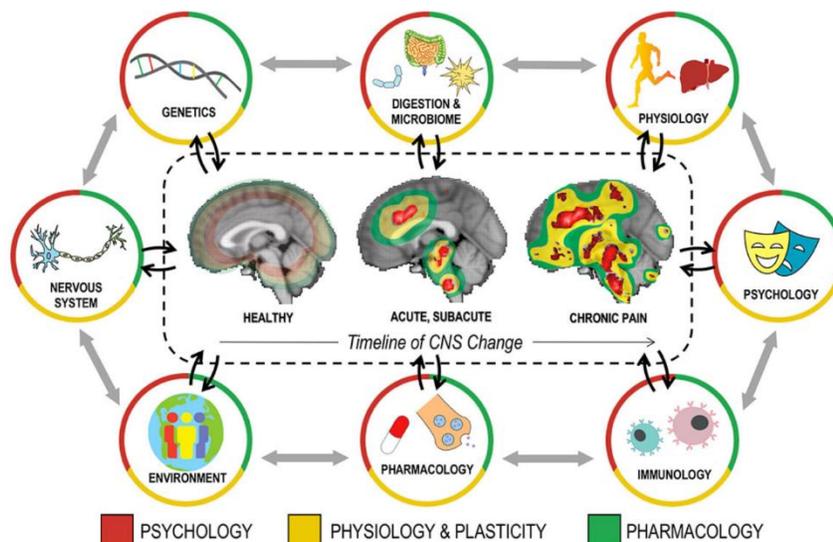
Physical factors include: Inflammation, stress, muscle tension, injury, tissue deterioration, issues with posture, muscle imbalance (stronger muscles some areas and weaker muscles in other areas), allergies/sensitivities, ongoing disease process (e.g., autoimmune, cancer), congenital disease process (e.g., sickle cell anemia), nutrient deficiencies, impaired bodily functions, inadequate sleep, muscle overuse, and many others [5].

Psychological and environmental factors include: depression, anxiety, post-traumatic stress disorder, social isolation, negatively impacting stressors, physical or psychological abuse or trauma, sexual abuse, exposure to disease, and others [4].

Any of these factors can contribute to the initiation of acute pain and allow for transition into chronic pain. Many types of chronic pain begin as acute pain with changes in the affected pain area – these could involve inflammation, muscle fatigue/imbalance, injury or any other physical factors listed above [5].

As these conditions persist, the pain and other symptoms may change or remain consistent, and it is thought that around three months of persistent pain in a local body region, changes in the central nervous system (brain and spinal cord) begin to occur [16]. These changes involve rewiring of the neural pathways to compensate for the ongoing pain, and many studies have shown evidence of brain changes in individuals with chronic pain compared to healthy pain-free individuals [12]. As this occurs, even if the local site of pain has healed or is treated, the rewired central nervous system could enable the experience of pain to continue and become chronic.

Once pain becomes chronic it is much more difficult to treat, and this may be because reversing the rewiring of the central nervous system is more difficult than improving physiology at the site of pain [6]. Pain that is found to be associated with an ongoing disease in the body is best addressed by specifically treating the effects and associated symptoms of the disease to reduce the impact of pain and prevent rewiring of the central nervous system neural pathways.



Schematic of some of the myriad interactions between the changes observed in the central nervous system and in other body systems in chronic pain states. Created by Dr. Martucci and Lisa Cha (undergraduate research assistant 2018).

## How to Reduce the Chance of Developing Chronic Pain – General Health Guidelines

Maintaining a healthful lifestyle is a strong intervention to prevent chronic pain [10].

- Maintain a healthful diet and weight
- Exercise regularly
- Eliminate unhealthy practices such as excessive alcohol use and smoking
- Work and rest in a variety of healthy postures
- Manage stress with deep breaths using the diaphragm muscles [13], participating in enjoyable activities, reducing sources of unnecessary stress whenever possible
- Seek counsel or psychological/behavioral therapy whenever needed [14]

## How to Manage Acute Pain and Prevent Transition to Chronic Pain \*Primary Prevention\*

Discuss the plan for pain management for the short-term pre-surgery or post-injury. Ensuring effective pain control can result in quicker resolution. Regular review of pain management is important. Doctors should take an individualized patient-centered approach and focus on multimodal treatment to prevent the transition to chronic pain [7].

*As recommended by the recent Pain Management Best Practices Inter-agency Task Force Report [18] it is advisable for patients to:*

- Take anti-inflammatory medications (for example, ibuprofen)
- Apply cold and/or heat to the affected areas
- Participate in therapeutic (mild to moderate) exercise
- Physical therapy (or physiotherapy), massage therapy
- Manage stress
- Obtain psychological support

*Additionally, it may be advisable to:*

- Take a short, tapered dose of oral steroids to reduce inflammation [9]
- Eat a low-inflammatory diet rich in fruits, vegetables, nuts, lean protein sources

## How to Manage and Prevent Worsening of Chronic Pain \*Secondary Prevention & Maintenance\*

Understand that chronic pain is common and often difficult to completely cure – good self-management of chronic pain is often the best form of treatment to get pain to a tolerable level for an individual. Positive, yet realistic, expectations for treatments or therapies can be more helpful than extreme or negative expectations. Whenever possible find a doctor and supportive individuals that you trust and feel comfortable with sharing your experiences. Multimodal and interdisciplinary treatments that use a variety of pharmacologic, physical, lifestyle, psychological, and alternative and complementary therapies are thought of as the gold standard and most effective way to manage and reduce chronic pain and its impact [1].

- Seek medical advice from a pain specialist / pain clinic if one is available in your area

- Take nonsteroidal anti-inflammatory drugs (NSAID) (for example, ibuprofen) to reduce inflammation
- Apply cold and/or heat to the affected areas
- Ask about medical treatments that include nerve blocks into joints or tissues. These are injections of pain-relieving medications and/or steroids to reduce inflammation
- Consider other medications for pain [21]: Gabapentin/pregabalin, tricyclic antidepressants, serotonin/norepinephrine reuptake inhibitors, topical agents (lidocaine, capsaicin)
- Continue regular mild to moderate exercise - keep moving your body and, when possible, the painful area
- Begin physiotherapy, ideally from a pain specialist
- Receive psychological support, ideally from a specialty trained pain psychologist
- Try complementary non-drug therapies for additional benefit: meditation, yoga, acupuncture, biofeedback, massage therapy, water/swim therapy
- If opioids are indicated for pain after a risk assessment is performed, have a plan with your doctor, review risks and benefits and ensure that you are taking the medication only as prescribed with specific goals as determined by you and your doctor [17, 18].

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