



# THE PSYCHOLOGICAL ASPECTS OF MUSCULOSKELETAL PAIN

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## ABSTRACT

Musculoskeletal injuries occur when the skeletal or muscular system is damaged and are the leading worldwide cause of disability. Musculoskeletal pain can become chronic, leading to emotional distress for sufferers, and because pain is closely interlinked with emotion, this distress and subsequent maladaptive thinking patterns can intensify the pain and lead to further disability. Depression, anxiety, somatization, and catastrophizing may occur as a result of pain, and all have negative effects on pain levels, pain management, and mobility and contribute to a lower quality of life for the patient. A bidirectional relationship may also exist between the psychological disorder and the pain, with one worsening the other. Traditional therapy for musculoskeletal pain management has focused on pharmacological intervention and rehabilitation; however, because psychological factors are important to the therapy outcome, interventions such as stress reduction and cognitive-behavioral therapy, amongst others, may be highly beneficial.

**KEYWORDS:** *musculoskeletal, pain, psychology, depression, anxiety*

## INTRODUCTION

Musculoskeletal injuries (MSIs) are incurred when there is damage to the skeletal or muscular system, which may affect joints, spinal discs, nerves, cartilage, tendons, or muscles. They can be a short-term problem that resolves after healing, as is the case for a sprain or fracture, or a chronic condition that severely affects a person's life, causing disability and limited mobility.

MSIs are very common, with a global prevalence of approximately 1.71 billion affected people, and are the greatest contributor to disability around the world. Low back pain, in particular, is responsible for the highest amount of global disability, affecting around 568 million people (1). Many people will have experienced musculoskeletal pain at least one time throughout their lives, as 47% of the general population is affected, and between 39 and 45% will suffer with chronic pain (2).

Some people are more at risk for developing musculoskeletal pain, as it is often influenced by personal habits, activity, and work. Apart from trauma and injury, some of the potential risk factors include medical conditions such as fibromyalgia, poor posture, advanced age, engaging in sustained repetitive movements, intensive physical activity, inflammation, a high-fat/high-protein diet, smoking, obesity, a sedentary lifestyle, work activity, and psychological conditions such as depression (with depression being a risk factor as well as a consequence of musculoskeletal pain) (3).

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Pain is the most common symptom of a MSI. The International Association for the Study of Pain (IASP) defines pain as an “An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage” (4). Pain from MSIs can be short-lived or continue and develop into chronic pain, defined by musculoskeletal pain that lasts for more than three months. Chronic musculoskeletal pain has social and psychological consequences. It is usually managed by pharmacological treatment and rehabilitation. Chronic musculoskeletal pain severely affects a person’s life with social and emotional repercussions, such as the loss of work, independence, and social interaction, depression, and anxiety (5). Daily pain can lead to disability, opioid dependency, and negative thought patterns that exacerbate the pain symptoms.

When dealing with MSIs, the physical symptoms are generally the focus of attention and have been well-identified. However, the pain can be debilitating, and focus needs to be given to the consequential emotional distress as well. Attention on the psychological aspects of musculoskeletal pain is useful for managing the acute and chronic pain that accompany MSIs and for improving patients’ quality of life.

This paper will summarize some of the key psychological responses to musculoskeletal pain, focusing on depression, anxiety, somatisation, and catastrophizing.

### *The experience of pain*

Chronic musculoskeletal pain is described by IASP as “chronic pain in the muscles, bones, joints, or tendons that is characterized by significant emotional distress (i.e., anxiety, anger, frustration, and depressed mood) or functional disability” and adds that pain is subjective and influenced by biological, psychological, and social factors (4). The pain is often intense and localized or may be felt throughout the entire body, as generalized aching, or as burning and nipping pain. Periods of inactivity may cause joint stiffness and aches, which may subside after movement. But the pain symptoms are variable, and the personal response to pain is unique and subjective (6). Levels of pain do not always correspond to the severity of an injury, and there is a wide variation of symptoms (2).

Because pain is subjective, self-reporting is used by clinicians to rate the intensity of a patient’s pain symptoms. This information is an important tool to guide treatment and predict clinical outcomes (7). Pain is usually assessed using questionnaires, with the patient rating their level of pain and the extent to which it affects their daily life. Scales that are commonly used in pain measurement include the numeric pain rating scale, the visual analogue scale, and the verbal rating scale. On a scale of 0-10, pain levels in musculoskeletal disorders were reported at levels of 7 and greater by approximately 25% of patients (8).

Attention is the first response to pain, followed by cognitive processing, appraisal, and interpretation, which leads to acting on the pain. The initial noxious stimulus provokes our attention, and this serves as a warning signal to invoke a response and modify our behavior to avoid physical harm. However, in the case of chronic musculoskeletal pain, the pain persists and cannot be alleviated, and the attention response is continually activated, even though an action may be futile (9). This can provoke psychological interpretations for dealing with the pain which may be harmful or destructive to a patient’s well-being. Pain is highly subjective, and each individual experiences pain in their own way, based on their previous experiences in the context of society and culture.

The perception of pain has a strong cognitive and emotional link. In fact, it was seen in imaging studies that independent of the actual pain stimulus, the emotional and attentional state does alter pain pathways in the brain, and that chronic pain sufferers show alterations in these brain regions. This could provide an explanation as to why those people with chronic musculoskeletal pain are at higher risk for anxiety and depression, and why psychological distress can even cause chronic pain to develop in the first place (10). Sex has also been shown to play a role in pain perception, with women being more susceptible to musculoskeletal pain due to biochemical and biological differences (11). Research has shown that women are generally more sensitive to pain and may experience higher levels of functional impairment, depression, and anxiety (12).

Environment and culture also play a role in the experience of pain, as behaviors can be influenced by societal expectations and cultural health beliefs. In fact, great differences have been shown between reported work-related musculoskeletal problems and disability between workers doing the same job in different cultural settings (13).

### *Health beliefs and distress intolerance*

Pain is obviously uncomfortable and distressing for musculoskeletal pain sufferers. However, the cognitive response to pain can greatly influence the treatment outcome and the evolution of symptoms (9).

Distress intolerance is an important factor in the experience of pain. It is the perceived inability to cope with one’s uncomfortable emotions. A person’s life experiences and environment are factors for their ability to tolerate stress, and there may be a biological basis to it as well. With intolerance, the hopelessness and vulnerability of uncomfortable

emotions can lead to avoidance and escape behaviors, with intense negative emotions motivating reactions to provide relief as soon as possible. In the context of pain, this could lead to anxiety and opioid misuse (14). In a fear-avoidance model of pain, subjects with MSIs will actively avoid movements that can lead to pain, which can interfere with their recovery (15).

Psychological factors have been shown to affect the treatment outcome of people with musculoskeletal pain. Negative, maladaptive reactions can predict poor outcomes, while positive thinking patterns can improve them (16). A low mood can hinder recovery and lead to higher and more persistent levels of pain. A patient's preoccupation with their health places great attention on their symptoms and can exacerbate them (17).

It is important to discuss the Health Belief Model, which focuses on self-efficacy. It states that health-related behaviors are influenced by a person's personal beliefs concerning their health status, the risks related to their condition, and how their behavior can lead to a positive outcome (18). Positive and pessimistic beliefs can predict treatment outcomes and the duration of musculoskeletal pain (19). Health beliefs develop throughout a person's life and are based on experience. These attitudes shape the experience of pain and illness, and the subsequent patient behaviors during the course of their condition (17).

Finally, it is important to note the co-occurrence of negative thought patterns and their connection to the creation and continuation of musculoskeletal pain. Pain, emotion, and cognition are intertwined, and a destructive, cyclic pattern may arise between psychological conditions, such as depression, and musculoskeletal pain perception. Positive thinking patterns can improve pain symptoms, whereas chronic pain can create emotional distress and depression, anxiety, somatization, and catastrophizing, which in turn can increase the perception of pain (11). Psychological factors are decisive in the evolution of musculoskeletal pain, as depression and distress intolerance can cause acute pain to transition to chronic pain and lead to disability (20).

### *Depression*

Musculoskeletal pain can be a predictor for depression, a mental health disorder characterized by a persistent low mood, loss of pleasure, and pessimistic thinking (21). It can be brought on by pain, and can also be the cause when depression exacerbates and even initiates pain, resulting in a destructive loop of pain causing depression and depression intensifying pain.

Depression can greatly affect a sufferer's quality of life and lead them into further destructive behavior, such as drug and substance abuse and suicide. A low mood generally aggravates the health condition and increases the rates of disability.

The link between chronic pain and depression is evident, with some studies showing that in between 30-60% of chronic pain sufferers there is depression as well (3). Depression ranks fourth as a cause of global disability and has additionally been linked with neck and low back pain (22). Research has shown that in musculoskeletal pain, depression is responsible for a worse prognosis, along with a higher degree of pain intensity, limited mobility, and disability. It has been demonstrated, in particular, to accompany knee pain, low back pain and neck pain (17). Musculoskeletal pain sufferers can have reduced physical activity and sleep problems, factors which have been linked to higher rates of depression (21).

The relationship between depression and musculoskeletal pain can be bidirectional, meaning that the pain may result in depressive symptoms that were not present before, as well as the reverse: depressive symptoms may actually bring about and worsen musculoskeletal pain in the first place.

### *Anxiety*

As with depression, rates of anxiety are higher in individuals with musculoskeletal disorders when compared to the general public (23). Anxiety involves feelings of fear, worry, and unease to an extent that it becomes overwhelming and has a negative effect on a person's life. Concern and fear about their condition can lead to anxiety in sufferers of musculoskeletal pain. Anxiety is commonly seen in chronic pain sufferers, and like depression, it can be bidirectional, meaning that anxiety can cause pain and vice versa (24).

Results have shown a 38% general increase in trauma-related phobias, and a 20-35% increase in anxiety and depression 12 weeks after hospital discharge for orthopedic trauma patients (25). Post-traumatic stress disorder can result after orthopedic trauma, affecting 20-51% of people after acute orthopedic trauma, and after six months with a higher-rated pain scale score, those odds increased (25).

A fear-avoidance belief may develop with the conviction that rest is necessary for an injury and the physical stress and positions that cause pain should be avoided because they are damaging and can negatively affect recovery. Fear-avoidance behaviors can limit mobility because in order to avoid the sensation of pain, the patient may become sedentary

and avoid movement at the pain site, which can hinder improvement of the condition and interfere with rehabilitation. For example, management of knee osteoarthritis, a condition of chronic pain generally seen in older adults, calls for movement and physical activity despite the pain. However, anxiety over the sensations of pain and the potential damage can deter patients from following this recommendation (26).

### *Somatization*

Somatization occurs when stress or emotional distress leads to the experience and reporting of somatic, or bodily, symptoms. A somatic symptom burden can heighten the awareness of pain and may intensify it. People who suffer from musculoskeletal pain can become hypervigilant with their symptoms, with a heightened awareness and sensitivity to pain. This hypersensitivity can lead to distress over common somatic symptoms, the inclination to intensify them, and to seek medical help. A somatising tendency is generally assessed by using questionnaires where patients are asked to report their general symptoms on a numbered scale and indicate the level of distress the symptoms caused them.

Studies have examined the link between somatization and back pain, in particular, and it was found to predict a transition from acute to chronic pain, and the success of treatment (27). People who tend to somatise have a higher level of medical care seeking but a lower level of satisfaction from that care, and report lower levels of social and work-related functioning. In addition, people who tend to somatise are more likely to develop musculoskeletal pain and eventual disability from it. Finally, it has been linked with the transition from acute to chronic musculoskeletal pain (17).

### *Catastrophizing*

Catastrophizing is another tendency that can occur in musculoskeletal pain sufferers. It is the tendency to view pain symptoms as overly severe, uncontrollable, and unmanageable, and leads to feelings of hopelessness in overcoming them. There is fear and difficulty in controlling pain-related thoughts before, during, or after they occur. Evidence has shown that people who catastrophize have heightened brain excitability, which can prepare them to be more sensitive to pain (28). It is an elevated emotional response that can influence the sufferer to retreat to escape or avoidance behaviors.

Studies have shown that the magnification of the negative effects of pain can have detrimental effects for those experiencing musculoskeletal pain (29). It can have negative effects for pain management and recovery, with increased mental stress, worsening and prolonging pain sensations, and leading to chronic pain. It can lead to pain intensity, a higher use of opioids, and disability (29). It has been shown that catastrophizing greatly increased the risk of the transition from acute back pain to chronic pain, and that it contributed to higher rates of nonrecovery in patients (29). Pain catastrophizing can lead to greater rates of pain reporting and seeking for medical care, with socioeconomic impacts (7).

Stress-reduction based treatments can be beneficial for patients who tend to catastrophize, though it is important to note that actual stress is not responsible for the outcomes of the condition, but the response to the stress. In fact, it was observed that catastrophizing is not dependent on the injury or impairment; it can occur throughout sufferers of chronic pain (30). In addition, cognitive-behavioral therapy can provide help and improvement.

## **CONCLUSIONS**

There is a clear association between the psychological state and the degree of disability, pain severity, and quality of life for people suffering from musculoskeletal pain. Pessimistic health beliefs, depression, anxiety, somatization, and catastrophizing can worsen musculoskeletal pain and cause disability. These cognitive factors may be intertwined, based on fear and helplessness that may result from maladaptive pain responses.

Maladaptive thinking patterns related to pain can exacerbate and lead to worsening of the condition, meanwhile positive thinking patterns, such as self-efficacy and resilience, combined with social support, can improve the long-term outcomes of chronic musculoskeletal pain. Based on this, if psychological distress can be lowered, improvements should be made in treating musculoskeletal pain, although further research is needed in this field.

Therapeutic avenues have traditionally included rehabilitation, the use of pharmaceuticals such as non-steroidal anti-inflammatory drugs, opioids, and surgery. However, due to the implications of psychological factors and their impact on recovery and pain management, other forms of treatment may be beneficial. These include exercise, yoga, meditation, acupuncture, cognitive behavioral therapy, stress reduction, and counseling. Yoga has been linked with improvement in back pain, while meditation has been shown to lower pain levels in many pain-related disorders (29). Cognitive behavioral therapy, which is based on the idea that “thoughts, feelings, physical sensations, and actions are interconnected,” aims to target the specific source of distress, and could be promising as a non-pharmacological intervention for the management of musculoskeletal pain (14,31).

*Conflict of interest*

The authors declare that they have no conflict of interest.

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