



How Sword Tackles the Complex Interplay of MSK Pain and Mental Health

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Introduction

Chronic pain triggers both a physical and mental response. You feel pain, of course, but you also endure it mentally and emotionally—especially if it's reoccurring and begins to disrupt your work and personal life.

Clinical studies have long demonstrated a strong association between chronic musculoskeletal (MSK) pain and depression. A change in pain severity is seen as a strong predictor of subsequent depression severity, and conversely, a change in depression severity is a strong predictor of pain severity.

In other words, patients who suffer from chronic pain are more likely to be depressed, and patients with depression are more likely to report symptoms of chronic pain.

It's a vicious cycle that helps explain why MSK pain and depression are one of the top contributors to workplace absenteeism and medical expenditures that cost U.S. employers at least \$50 billion combined annually.

That's why Sword Health's MSK solution takes a holistic approach to achieve lasting pain relief, incorporating both physical and psychological interventions. Our clinical model combines behavioral health, prescribed exercises, and education to address both mind and body so members get the best possible outcomes.

The deep connection between pain and depression

Numerous clinical studies have revealed a reciprocal relationship between chronic pain and depression. So it's not at all surprising that these conditions are the two most prevalent conditions seen in the general population, with co-occurrence rates of 30–50%.

Chronic pain is one of the most common physical ailments in the world. Musculoskeletal conditions are the leading contributor to disability disorders globally, with low back pain being the single leading cause of disability in 160 countries. In the United States alone, more than half of adults suffer from MSK pain, comparable to the total percentage of Americans living with a chronic lung or heart condition.

Meanwhile, major depression ranks as one of the most widely reported mental disorders in the U.S. According to one reliable, federally-funded study conducted in 2019, an estimated 19.4 million American adults had at least one major depressive episode in that year.

How these extremely prevalent and debilitating conditions intertwine and feed off each other has been the subject of a growing body of medical literature. Here's what we know:

The majority of people who struggle with depression also have chronic pain, and a close majority of people with chronic pain will experience depression—65% and 50%, respectively. This means that more often than not, a patient with one condition will also exhibit symptoms of the other.



People who struggle with depression also have chronic pain



People with chronic pain will experience depression

There appears to be a bidirectional relationship between the presence and severity of pain and the presence and severity of depression. Depression can trigger pain—and pain can trigger depression. Pain and depression seem to create a perpetual cycle in which pain makes symptoms of depression more severe, and in turn, depression worsens symptoms of pain.

In other words, depression is not simply a comorbid condition but interacts with chronic pain to increase morbidity and mortality—and vice versa.

For instance, studies have shown that patients with multiple pain symptoms such as back pain, headache, and abdominal pain are 3 to 5 times more likely to be depressed than patients without pain. Meanwhile, pain symptoms are associated with at least a two-fold increased risk for coexisting depression.

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We also know that fibromyalgia, a disorder characterized by widespread musculoskeletal pain, is strongly associated with various psychological disorders. These include major depressive disorder, bipolar disorder, anxiety disorders, post-traumatic stress disorder, obsessive compulsive disorder, and substance abuse.

For patients with persistent MSK pain, a change in pain levels can be a strong predictor of depression severity and vice versa. Additionally, feelings of depression and anxiety are seen as a risk factor for acute pain to become chronic.

Additional evidence on the overlap between musculoskeletal pain and mental health is the increased prevalence of both anxiety and depression in patients with MSK conditions (5-fold for anxiety and 3-fold for depression). It is also known that MSK pain is an important predictor of depression in the general working population.

Researchers have given a name to this clinical interplay between these conditions—the depression-pain dyad.

The label implies that the disorders often coexist, share the same biological pathways, exacerbate one another, and respond to similar treatments. Indeed, many of the pathways identified as important for the MSK disorder known as “chronic widespread pain” and fibromyalgia sit within pathways that are also important for regulating mood. Meanwhile, antidepressants that are effective against major depression have been shown to be efficacious in the treatment of MSK disorders.

Why employers cannot ignore the pain-depression combo

Beyond the fact that MSK disorders or depression on their own will lead to greater medical costs, increased worker absenteeism, and lower productivity, the combination of the two is especially concerning to companies for two reasons.

The first is that pain and depression complicates and generally hinders the recovery process for patients because they appear to mutually promote the severity of the other condition. Pain slows recovery from depression, and depression makes pain more difficult to treat. For instance, the onset of major depression may cause patients to drop out of pain rehabilitation programs.



Studies show that chronic pain-induced depression exhibits a poorer prognosis than those with chronic pain only. At the same time, chronic pain and depression are closely correlated in terms of how they develop and progress, so treating one requires an understanding of the other and a holistic approach that encompasses both conditions simultaneously.

This means employees with MSK pain will take longer to recover if they exhibit comorbid depression, which behooves companies to choose solutions that are able to effectively take a “whole-body” approach to MSK treatment.

The second point is closely related to the fact that MSK patients with accompanying depression are often more difficult to treat. People suffering from chronic pain who also exhibit depressive symptoms become very heavy consumers of medical services, even if they don't report other underlying conditions or illnesses.

In fact, medical costs for people with chronic pain who are also depressed are significantly higher for patients with either condition alone. A 2009 study found that averaged over a two-year period, total annual costs for patients with both major depressive disorder and disabling chronic pain were more than 25% higher than for patients with major depressive disorder and chronic non-disabling pain (\$7,743 and \$6,161, respectively) and more than 37% higher than for patients with major depressive disorder with no chronic pain (\$7,734 and \$5,623, respectively). We would expect those costs to be even higher using 2021 dollars.

Total annual costs for patients with both major depressive disorder and disabling chronic pain



- Patients with both major depressive disorder and disabling chronic pain
- Patients with major depressive disorder and chronic non-disabling pain
- Patients with major depressive disorder with no chronic pain

These two factors combined—the additional complexity of treating MSK pain with depression and the increased cost of doing so—should compel companies to choose wisely when it comes to evaluating and selecting an MSK solution for their populations.

How Sword's MSK solution targets both body and mind

Sword's digital MSK program has been clinically proven to improve mental health and pain at the same time.

In a peer-reviewed study published in the [Journal of Medical Internet Research \(JMIR\)](#) in July 2022, we were able to demonstrate that our multimodal digital care programs can produce substantial improvements in both mental health (anxiety and depression scores) and productivity even in members with significant depression at baseline.

Members with MSK issues who also had mild depression were able to reduce their depression scores by 51% and anxiety scores by 41% after using Sword. Members who had moderate depression saw reductions of 29% in depression and 21% in anxiety scores. Importantly, many members who present with moderate or severe depression or anxiety end the program in the mild category (where it is no longer clinical anxiety or depression).

Here's how we do it:

Our doctors of physical therapy (DPTs) are specifically trained to treat patients with the understanding that pain and mental health are deeply interdependent, creating a self-sustaining loop. They know that a purely biomedical approach to the treatment of chronic musculoskeletal conditions, particularly with regard to pain management, isn't nearly as effective as a comprehensive intervention model that incorporates emotional and mental factors.

In other words, our physical therapists understand that overcoming pain doesn't just come from patients performing their prescribed exercises. Members also need to be guided through the mental and emotional obstacles that can inhibit long-term recovery.

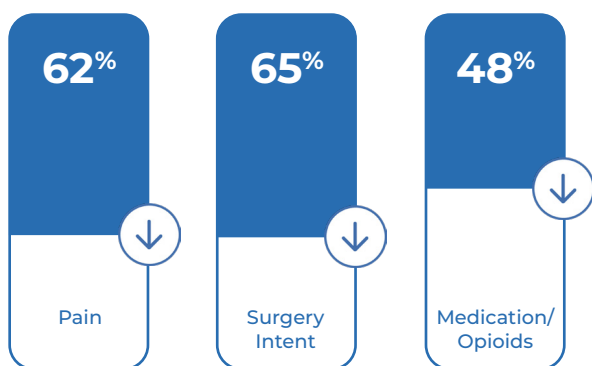
Hence, our digital MSK solution takes a multidisciplinary approach, combining exercise, education, and the close guidance of our DPTs. It starts with movement exercises that are minutely captured by our FDA-listed sensor technology, which generates data that is continually evaluated by our clinicians to create a tailored treatment plan for each member.

Next comes tools that incorporate cognitive behavioral therapy (CBT) and mindfulness techniques to help members deal with their perception of pain, which can be as powerful as the physical sensation of pain itself.

CBT has been part of treatment for chronic pain for decades. The effectiveness of CBT programs in treating chronic pain has been confirmed by systematic reviews. Our clinicians employ CBT to offer members behavioral coaching along the way to help them think differently about their pain.

Finally, education is a critical part of the Sword program. Members get access to an 8-week CBT and mindfulness program specifically designed to help them overcome the anxiety and depression associated with chronic MSK pain.

Utilizing this whole-body, multipronged approach, our digital MSK solution drives proven results. On average, Sword members experience a 70% reduction in pain, a 65% decrease in surgery intent, and 48% less opioid consumption.



Less pain equals less depression. In fact, we see a 52% drop in depression and 32% increase in employee productivity. These outcomes lead employers to 34% savings in MSK costs, and—perhaps most importantly—the opportunity for their people to find relief from pain.

Conclusion

Physical and mental health cannot exist without the other. The more physically fit you feel, chances are you'll also feel happier and more productive at work. Unfortunately, when an MSK condition makes it difficult to walk, bend over, exercise, or participate in the activities that you love, it can trigger anxiety and even major depression.

Those feelings, in turn, can prevent you from going into work or generally go about your day—which can lead you to feel even more depressed and feel pain more acutely, repeating a vicious cycle.

With the high prevalence of pain and depression among the working population, it's critical for companies to identify solutions that can effectively address both body and mind simultaneously. Sword's holistic program, led by doctors of physical therapy trained in CBT and other psychosocial strategies, does just that—with clinically validated results.



Dr. Vijay Yanamadala is the Chief Medical Officer at Sword Health.

A graduate of Harvard Medical School, Dr. Yanamadala brings over a decade of clinical medical expertise as a world-renowned surgeon with a firm belief in reducing dependency on surgery through data-driven and patient-centered treatment plans. He has published over 65 peer-reviewed scientific articles, received numerous certifications from leading medical institutions, and helped pioneer spinal surgery procedures. In his role at Sword, Dr. Yanamadala ensures that the company stays committed to providing members with care that meets the highest clinical standards.