

## REVIEW ARTICLE

# MINDFULNESS: PRINCIPLES AND APPLICATION TO DECREASE OPIATE USE IN PRIMARY CARE WITH AN OSTEOPATHIC COMPONENT

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Mindfulness

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## ABSTRACT:

Mindfulness is a focused approach toward accepting one's thoughts without judgment or perseveration, with ancient Indo-Sino-Tibetan philosophical origins. Many variations exist; however, they typically include focused attention where one concentrates on a specific sensation such as breathing and open monitoring where one concentrates on consciousness itself. Mindfulness-based interventions (MBIs) are specific, organized, targeted methods to teach mindfulness with specific goals.

MBIs have shown benefit in pain patients. MBIs teach the individual the concept of pain coping, encouraging cognitive flexibility and attempting to discourage the fear or alarm reaction of pain, instead focusing on the quality of life and functionality. Mindfulness-based stress reduction (MBSR) showed a 30% significant improvement in pain intensity and pain coping at six months in patients with chronic low back pain, compared to opiates and NSAIDs, which showed no benefit.

MBIs have also shown benefit in addiction, as they help the individual relearn to control cravings, habit modification and attempt to restore the natural reward system while improving regulation of emotions. Applications to opiate use disorder are significant as patients learn to enjoy the lifestyle of recovery and learn to believe they can improve. Additionally, other comorbid conditions are known to improve with MBIs and mindfulness-based principles support the holistic principle of mind, spirit and body consistent with osteopathic medicine.

## INTRODUCTION

Mindfulness is a focused approach toward acceptance of one's moment-by-moment thoughts, sensations and cognitions, without judgment or perseveration,<sup>1</sup> that is commonly described as a state of purposeful, metacognitive awareness.<sup>2</sup> It is thought to be derived from various origins, including the ancient Indo-Sino-Tibetan philosophies,<sup>1</sup> and Vipassana, Buddhist and Zen practices.<sup>2</sup> The main objective of this manuscript is to describe mindfulness, provide an overview of basic approaches and interventions and discuss applying these principles into primary care, with foci on both pain control and opiate addiction<sup>2</sup> in an effort to reduce opiate use.

## BASICS OF MINDFULNESS MEDITATION

Mindfulness meditation is a label given to any episode in which an individual uses the mindfulness principles. Though many variations exist, common teachings start with one finding a quiet space with limited distractions, sitting in a firm chair with feet flat on the floor and hands resting on the knees, palms up. A common alternative is with one sitting on the floor with legs crossed and hands on the knees.

A typical episode begins with focused attention in which an individual concentrates on one sensation in an effort to disengage from others. A common practice for the individual is to focus on his or her breathing, down to the detail of how each breath comes and goes. This may progress to a body scan using the same focus to proceed through one's entire body. This centers the individual on specific interoceptive and proprioceptive sensations. A surrogate may be an external focus, but with the same bottom-line goal of disengaging from other thoughts, emotions and distractions.<sup>1</sup>

Open monitoring commonly follows where one will begin to concentrate on consciousness itself, especially the temporality of thoughts or how quickly they come and go.<sup>1</sup> As one goes through these steps, the goal is to reveal how a particular flow

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of consciousness is momentary and unending. Though there is variation, typical sessions will begin with focused attention then transition to open monitoring. Each session's duration may vary per person and goal, though it is common for learners to start with 5–10 minutes daily, then increase the time spent and frequency as one becomes more comfortable.<sup>1</sup>

At the early stages of practicing, individuals will begin to engage and enhance the top-down regulation of lower-level afferent processing by forcefully refraining from further processing of judgmental and ruminating emotional stimuli. It is important to discuss the Monitor and Acceptance Theory posed by Lindsay and Creswell (2019), positing that mindfulness training encompasses a continuum of two concepts. Mindfulness awareness reflects tending to present experiences at the moment, while mindfulness acceptance describes the attitude of recognizing a current experience without judgment. This is a significant distinction as it is important to teach both concepts together; mindfulness-awareness without mindfulness acceptance may increase distress.<sup>3</sup>

As episodes become more common, a decoupling between the sensory process and assessments or judgments will occur.<sup>4</sup> This will allow one to remove the automaticity that commonly results from pain or addiction, instead permitting one to become accepting and nonreactive towards distressing thoughts and emotions.<sup>1</sup> Frequent and thoughtful practice cultivates increased internalized attention,<sup>4</sup> and ultimately, the concept of trait mindfulness, which is a durable mindset of purposeful, mindful principles during life's everyday challenges.<sup>1</sup>

Mindfulness-based interventions (MBIs) are commonly used to include all intervention methods and application of the mindfulness principles, but each with a targeted approach and goal. Many sources refer to MBIs as self-cognitive behavioral therapy methods or mental training designed to exercise and renew dysregulated neurocognitive processes.<sup>5,6</sup> They allow focusing on the etiology of thoughts, how to control them and understanding one's reactions to them without perseveration while focused on specific targets such as stress, recovery or relapse prevention.<sup>1,4,7,8</sup>

## APPLICATION TO PAIN CONTROL

Mindfulness application to pain control can be extremely effective, though difficult to interpret or give specific recommendations given heterogeneous studies with varied complaints. A Cochrane review stated in 2013 the incidence of chronic pain in America was 11.2%.<sup>16</sup> Later, a 2019 Cochrane review reported 20% of adults suffer from chronic pain not caused by cancer.<sup>9</sup> Additionally, the CDC guideline recommends pursuing non-opiate pharmacologic treatments and alternative therapies as the first line for chronic pain<sup>2,17</sup> with a focus on mindfulness.

It is important to understand the concept of illness expectations, often interpreted as nothing can be done to help, which demonstrates cognitive rigidity. MBIs focus on teaching cognitive flexibility through illness perceptions, the alternative that behavioral change can alter the sensations experienced.<sup>18</sup> Additionally, many sources voice fear or alarm reaction of pain, which can make the perception of pain worse and lead to other physiologic changes such as increased muscle tension. Sources focused on pain sensation do show that mindfulness-meditation induced pain relief is associated with a reduced thalamic activity, which may further attenuate low-level sensory processing.<sup>2,19</sup>

Mindfulness modalities teach to focus on pain coping<sup>11</sup> concentrating on the quality of life and functionality of an individual, rather than the pain perception itself.<sup>2</sup> A brief three-day Randomized Control Trial (RCT) with mindfulness meditation was effective in reducing pain ratings to experimentally-induced pain.<sup>12</sup> A 2015 Cochrane review for fibromyalgia showed that psychological intervention therapies (including mindfulness) have low-quality evidence of improving physical function, pain and mood for adults compared to control.

Chronic low back pain (cLBP) is the most common long-term noncancer pain for which long term opioids are prescribed,<sup>8</sup> and is the leading cause of disability in America.<sup>20</sup> Morone (2019) showed that MBSR had a 30% improvement in pain intensity and pain coping at six months and beyond with cLBP patients, contrasted with opiates and NSAIDs, which showed no benefit.<sup>11</sup> The American College of Physicians now recommends MBSR for

**TABLE 1:**  
Brief description of mindfulness-based interventions (MBIs)

Mindfulness-Based Stress Reduction (MBSR)	Most common MBI. Eight weeks long with a workbook and daily homework assignments. Requires a trained professional. Typically has a one-day silent retreat. <sup>2,8,11,12</sup>
Mindfulness-Oriented Recovery Enhancement (MORE)	Eight weeks long. One session per week combining mindfulness and cognitive behavioral therapy. Focusing on positive influence and social support. <sup>1,9,10</sup>
Mindfulness-Based Relapse Protection (MBRP) <sup>1,7,13</sup>	Eight weeks long. Group therapy. Self-monitor cravings and negative affect. <sup>1</sup> Reduces impulsivity, relapse. <sup>13</sup> Prepare patients for environmental relapse risks. <sup>7</sup>
Mindfulness-Based Cognitive Therapy (MBCT) <sup>1,14</sup>	Eight weeks long. Two hours per week. <sup>14</sup> Focus on responding to negative thoughts and emotions. <sup>2</sup>
Mindfulness-Based Therapy (MBT) <sup>5</sup>	Based on MBSR and MBCT. Three-week period with twice-weekly group classes and daily practice. <sup>5</sup>
Mindfulness-Based Cognitive Behavioral Therapy (MBCBT) <sup>2</sup>	Contemporary interpretation of mindfulness and Cognitive Behavioral Therapy. <sup>2</sup>
Mindfulness-Based Acceptance and Commitment Therapy (MBACT) <sup>15</sup>	Focus on overcoming negative thoughts and feelings. Focus on accepting difficulties and being active to improve outcomes. <sup>2</sup>
Mind-Body Skills Groups (MBSG)	Mind-body skills, including mindfulness intervention and meditation. Ten weeks. Groups of 8–10 participants. Two hours once a week, with a one- and two-months booster. <sup>15</sup>

cLBP as one of thirteen nonpharmacologic therapies.<sup>2,8,21</sup> One RCT showed after 26 weeks that adults with cLBP, treated with MBSR and compared with CBT and usual care, had improvement in pain and function with MBSR compared to usual care, but no significant difference between MBSR and CBT. This suggests both treatments are equivocal.<sup>22</sup>

Another pilot, 26 weeks RCT, assessed meditation-CBT intervention, mindfulness for chronic pain among cLBP with long term treatment of opioids. At 26 weeks, there was a significant improvement in pain intensity, reduced pain sensitivity, with a dose-responsive decreased pain sensitivity to noxious thermal stimuli at eight and 26 weeks, suggesting meditation-CBT reduced CNS sensitivity and hyperalgesia. The improvements in physical function, pain acceptance and inflammatory biomarker profile did not reach statistical significance but did favor the meditation-CBT group.<sup>8</sup> And further, a pilot study on mindfulness-based therapy showed a significant decrease in chronic tension-type headache frequency but not intensity or duration.<sup>5</sup>

## APPLICATION TO OPIATE ADDICTION

A Cochrane review stated in 2013 that 1.9 million Americans abused or were dependent on opiates.<sup>16</sup> Addiction encompasses automatic, habitual or stereotyped responses, without conscious volition, free will or regard for consequences. Addiction is thought to occur secondary to neural dysregulation from substance abuse leading to a cycle of cravings and compulsivity.<sup>1,23</sup> In short, addiction can be considered mindlessness or the direct opposite of mindfulness.<sup>1,2,7</sup> Cravings are considered strong desires that intrude and overwhelm to use a drug, while a pleasant reward memory is superimposed on a negative emotional state.<sup>7</sup> Positive emotions from the drug-liking effect cause a negative effect of reinforcement and are thought to cause neurobiological changes such as atrophy of the prefrontal cortex and its cognitive control networks.<sup>1,23</sup>

Cravings can be further described to include tonic cravings or background cravings, which occur in the absence of outside factors or triggers, typically from underlying negative effects from abstaining or withdrawal. Phasic craving, also known as cue-induced, describes specific triggers or events that initiate a craving.<sup>7</sup> Teaching mindfulness focuses on countering these addictive behaviors, working towards habit modification, attempting to restore the natural reward system, improving regulation of emotions and increasing distress tolerance.<sup>4</sup> It aims to teach acceptance and non-judgment as described above and has been shown to reduce cravings overall, both underlying tonic cravings as well as preparing individuals to accept and cope phasic cravings from environmental cues and triggers. It works by encouraging bottom-up control, modifying the perception and understanding of cravings and negative affect, as well as top-down control by having control over behavioral response to cravings.<sup>24,25</sup>

This cognitive control can strengthen the medial and lateral prefrontal cortices,<sup>26</sup> thereby improving self-control, responding to inhibition, improving thoughtful decision-making, reducing stress and preventing relapse.<sup>1</sup> One study showed additional structural changes, such as reducing gray matter in the amygdala,

part of the impulsive system, with concomitant increases in gray matter concentrations of the hippocampus, responsible for learning and memory.<sup>7</sup> A Cochrane review in 2017 demonstrated inconclusive results with MORE with Addiction<sup>9</sup> with low quality. An ultra-brief primary care study with MBSR showed promise for reducing actual substance use, cravings and relapse rates over 12 months.<sup>24</sup>

Opiate use disorder is a chronic and relapsing condition of negative affect, craving and impulsivity.<sup>7,11</sup> Many MBIs can be used to assist OUD patients. As they begin to learn mindfulness, patients often mention the appeal of non-pharmacologic treatments allowing them to enjoy the lifestyle of recovery rather than living in an abnormal state of being an addict.<sup>23</sup> The most important aspect is that the patient believes they can improve and commit to recovery.<sup>23</sup> The mindfulness principles will encourage focusing on positive outcomes such as dealing with stress, finding peace and improving one's motivation to remain in recovery.<sup>10</sup> MBSR has been shown to reduce cravings, relapses and substance use.<sup>24</sup>

## EFFECT ON COMORBID CONDITIONS

A patient's medical and psychiatric history can profoundly affect the perception of pain and addictive cues and ultimately contribute to relapses. Various studies with comorbid conditions show both pain patients and addiction patients have improvement and a more positive outlook upon learning mindfulness.<sup>24</sup> Mindfulness has been shown to improve anxiety, depression, sleep, schizophrenia and other comorbid psych illness, all common risks for worsening pain and increasing the chance of relapse.<sup>4,8,24</sup> A systematic review of mindfulness meditation for SUD supports reducing comorbid psych conditions including depression, anxiety and stress.<sup>24</sup> A study on PTSD shows a decrease in hyperarousal and avoidance, with improved anger control and sleep.<sup>15</sup> A study with MBSR showed a marginally greater decrease in cortisol levels collected at 35 and 60 minutes post-stressor onset. Though not specific, this may support overall decreased stress levels in these patients.<sup>20</sup>

## OSTEOPATHIC COMPONENT

The founding father of osteopathy, A.T. Still, in his early writings, wrote that the human body is a "delicate and perfect machine" with osteopathic physicians having the task of correcting or reestablishing this fine balance. He felt one should find the cause first, "He [the osteopath] should go back to the cause which when corrected results in a disappearance of the effect."<sup>15,27</sup> He felt the opioid epidemic of his time after the Civil War was worsened by focusing on the pain and addiction, not the cause of symptoms.<sup>27</sup> Mindfulness aims to realign the focus on pain and addiction, the origin of sensations and the holistic principle of mind, body and behavior interconnectedness,<sup>28</sup> key components of osteopathic medicine.

## BARRIERS TO USE

Initially, many patients are resistant to accepting the benefits of any therapy that is not pharmacologic and the most important ingredient is the person committing and believing they can improve.<sup>11,23</sup> A key point to discuss with patients early on is MBIs may make symptoms worse, as they encourage the patient to focus on the symptoms.<sup>2</sup> Educating that this increase is only temporary is extremely important.<sup>2</sup> Additionally, the individual may have a lack of immediate benefit and must comprehend that there is a significant time investment.<sup>1,10,24</sup> Other challenges include the feasibility of finding an appropriate practitioner, difficulty building relationships with the person teaching MBIs and finding adequate, quiet space.<sup>10,24</sup> The most important step is informing the patient regarding the long-term benefits.

## APPLICATION TO PRIMARY CARE

To apply the basics described above, one must understand the basics of mindfulness, develop and understand high-yield steps to teach patients and address the underlying issues. There are many workbooks that providers can recommend to patients as a start. A single-group, cohort pilot study involving three family practice physicians, all trained in mindfulness meditation, performed ultra-brief interventions to OUD patients, including scripted, timed, educational sessions lasting 10–12 minutes, with handouts and audio exercises. Results revealed greater cognitive control over cravings and negative emotions at two, four-and six-months follow-ups, with a statistically significant difference in the relapse rate between higher uptakes of home mindfulness practice with possible confounders.<sup>24</sup>

## CONCLUSION

Mindfulness basics and MBIs show promise in decreasing pain perception, the sensation of addiction cues and ultimate opiate use. A variety of studies do support the use, though most with low-quality evidence. The family practitioner can benefit from learning these basics and trying to teach patients while awaiting more direct studies with higher quality evidence.

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