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Mindfulness Meditation: A Primer for Rheumatologists

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Introduction

Meditation, with its origins rooted in ancient religious and spiritual practices dating back over 2,500 years ago, has only in the past several decades begun to capture the attention of mainstream Western researchers and healthcare providers who are gradually beginning to value this mind-body practice as a tool to foster improved physiological and psychological health [1]. In the current medical environment, it is not uncommon for patients to report the use of mind-body therapies as an adjunct to Western medical treatment[2]. Over the past decade there has been increasing interest in meditation as a mind-body approach, in mindfulness meditation, given its potential to alleviate emotional distress and promote improved well-being in a variety of populations[3-5]. The overall purpose of this review is to provide the practicing rheumatologist with an overview of mindfulness and how it can be applied to Western medical treatment plans to enhance both the medical and psychological care of patients.

What is Mindfulness?

The word mindfulness is derived from the Pali word *sati*, meaning “to remember”, with secondary meanings of “attention” and “awareness”. Remembering refers to reconnecting to the immediate moment of experience, not the recollection of a past event. A contemporary definition of mindfulness offered by Kabat-Zinn, states that mindfulness is the awareness that emerges through, “paying attention on purpose, in the present moment, and non-judgmentally, to the unfolding of experience moment to moment”[6]. Similar descriptions are offered by other leaders in the field including: “mindfulness is the nonjudgmental observation of the ongoing stream of internal and external stimuli as they arise”; and “a receptive attention to and awareness of present events and experience”[7,8]. Notably, two concepts pervade these descriptions of mindfulness: 1) holding one’s attention in the present moment; and 2) maintaining an attitude of acceptance, openness, and non-judgment [9]. The

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validity of this two component model has been debated; however, it still remains a useful, widely accepted definition[10,11].

Mindfulness meditation (process) is a mental technique which is used to strengthen the capacity to establish and sustain mindful awareness (outcome) [12]. The practice of mindful meditation cultivates attentional focus and stability by directing the mind to remain connected to the present moment experience. Attention is usually sustained by concentrating on the breath [6]. Participants are instructed to follow the flowing cycle of breathing with their full attention. Depending upon the exercise, the focus of attention can vary and may include sensations in the body during rest or movement, a sound, or a visual focus like a candle flame or an image. Although the object of focus varies, in all instances the goal of the practice is to train attention to remain fully engaged with the experience and remain in the present moment. While this may seem simple; after attempting to keep attention focused for only a few moments, it is natural for novices to relate difficulty maintaining focus on the present moment. Without training attention drifts and becomes lost in memories of the past and thoughts of the future. With practice over time, remaining in the present becomes easier and is more likely to occur spontaneously. Meditation is simply a tool to assist in the acquisition of an awareness which is broad, balanced, present-focused, and behaviorally neutral.

Health Benefits Linked to Mindfulness Practice

A relatively wide collection of studies, of varying quality, in healthy subjects have linked mindfulness training to improvements in stress, anxiety, and depressed mood [13-16]. Mindfulness is also effective at decreasing stress and promoting positive mood states in patients with a variety of chronic health conditions [17-28]. Studies examining the effects of mindfulness training on traditional Western medicine outcomes, including morbidity and mortality, are beginning to emerge [28]. Data from the field of psychiatry and mental health shows that mindfulness interventions can be efficacious in the treatment of mood disorders [5,7,29]. Furthermore, accumulating data supports the notion that mindfulness meditation may ameliorate physiological changes that accompany chronic mental and emotional stress, including improved cortisol secretion profiles and beneficial anatomic changes in the brain [30,31]. While these early findings are encouraging, clearly additional work examining psychological and physiological changes that occur during and following mindfulness meditation training to further examine the health benefits are necessary.

Proposed Mechanisms of Action

Given the significant salutary effects of mindfulness training, the question remains, “what mechanisms are mediating these outcomes?” [5,7,31]. The mechanisms through which mindfulness decreases stress and increases well-being are not well understood; however a variety of proposed mechanisms of action abound in the literature. We will briefly review several of the more prominent theories. One popular hypothesis is that the cultivation of mindfulness facilitates a fundamental shift in perspective, termed *reperceiving* [11]. Similar to *decentering*, *reperceiving* refers to observing one’s thoughts and feelings as temporary, emotion-neutral events occurring in the mind which do not require judgment. Shapiro theorized that *reperceiving* leads to greater clarity, objectivity, and equanimity, and facilitates improved self-regulation, values clarification, cognitive and emotional flexibility. Empiric testing of this theory however suggests that *reperceiving* and mindfulness are in fact overlapping constructs and there is little support that *reperceiving* alone mediates improvements in psychological outcome variables [32]. Others speculate that it is the development of mindful awareness that mediates improved psychological outcomes [33]. In a group of novices, there was a positive relationship between the time practicing meditation

and 1) the tendency to be mindful in daily life; 2) psychological improvements. Increased mindfulness in turn mediated the relationship between time spent meditating and reductions in stress and improvements in psychological functioning [34]. Additional work supporting this concept showed that long-term meditation practice is associated with being able to describe one's internal experiences with words and to be nonjudgmental and non-reactive toward them [35]. Furthermore, these key constructs of mindfulness were found to mediate the relationship between meditation experience (measured in months) and well-being in experienced meditators. These findings support the notion that mindfulness is cultivated through meditation and may mediate the relationship between meditation practice and improved mental health.

Experimentally, changes in the ability to direct and manage attention have been demonstrated after only five days of mindfulness meditation training as well as after longer periods of training [36,37], however what is the therapeutic value of maintaining a present-focused attention that is non-judgmental and non-reactive? Self-focused attention, in the form of rumination, is linked to a variety of psychological maladies and poor outcomes. Rumination is the mental propensity to repetitively think about situations, thoughts, feelings or emotions which are typically of a negative nature. It has been theorized that the self-focused nature of the rumination is not harmful; rather it is how one processes these thoughts that predicts maladaptive outcomes. Sustaining a mindful self-focus that encourages a non-judgmental, non-reactive awareness of the present moment, even in subjects prone to rumination, promotes a mode of self-thought processing that is more adaptive [38,39]. Additional benefits of self-focused attention have been theorized including increased mental flexibility, improved self-regulation, decreased emotional reactivity, and reduced avoidance [24,40-42]. For a more in depth consideration of these issues, readers are directed to Baer's thoughtful review [43].

Common Methods Used to Teach Mindfulness

In this section we will briefly review the most common mindfulness approaches utilized by patients. The intent is to enable the practicing rheumatologist to make more informed recommendations to patients interested in incorporating mindfulness into their treatment plans. The completely secular nature these approaches accommodates a wide audience. These interventions follow in the footsteps of earlier psychological approaches, including behavioral therapy and cognitive behavioral therapy (CBT). In stark contrast to CBT, where the emphasis is on the use of cognitive restructuring of beliefs that mediate negative affect, the so called "third wave" therapies promote the creation of a constructive relationship with disturbing emotions, which ultimately promotes acceptance[44].

Mindfulness Based Stress Reduction (MBSR)

Likely the most well-known and popular program designed to train participants in mindfulness, is the Mindfulness-Based Stress Reduction (MBSR) program, developed in the 1970's by Jon Kabat-Zinn at the University of Massachusetts [24]. Initially developed as a behavioral intervention for patients with chronic pain and stress-related conditions, MBSR has expanded globally and can now be found in a variety of health care and community settings and in over 400 hospital and medical school settings in the United States [21]. MBSR is a standardized program conducted as an 8-week class with weekly sessions typically lasting 2.5 to 3 hours. During the training participants practice: 1) sitting meditation using the breath as an anchor; 2) contemplative walking; 3) mindful movement through the use of gentle Hatha type yoga postures; and 4) the body scan in which participants practice attention control by systematically focusing on the sensations in various parts of the body. Near the end of the 8-week training program application of mindful awareness to daily activities, often referred to as "informal mindfulness practice," is

encouraged. Mindfulness activities are practiced both in class and as homework. Audio recordings are provided to support home practice. Participants are expected to complete approximately 45 minutes of formal mindfulness practice at least 6 days per week during the eight week period. During an all day retreat near the end of the training, participants remain in silence and have the opportunity to practice their newly acquired mindfulness skills during a sustained and uninterrupted period of time. An essential component of the weekly classes includes discussion about the experiences that occur during the practice of mindfulness both in and out of the classroom. The impact of teacher experience, frequency of weekly session attendance, duration of home practice and frequency of home practice likely affects the degree of symptomatic improvement reported by participants, but results have been mixed [18,19,45-49]. Patients can be referred to the Center for Mindfulness in Medicine, Healthcare, and Society at the University of Massachusetts for a listing of teachers who have completed standardized MBSR training (<http://www.umassmed.edu/cfm/stress/index.aspx>).

Mindfulness Based Cognitive Therapy (MBCT)

Largely based on the concepts of mindfulness derived from MBSR, the focus of MBCT is on the treatment of depression rather than stress [50]. Specifically designed for use in the prevention of depression relapse, its theoretical foundation rests upon research showing that those individuals most vulnerable to depression relapse are those who have mood-related reactivation of negative thinking patterns and inappropriate responses to negative thoughts and emotions [51-53]. A combination of mindfulness training and cognitive therapy are utilized to cultivate a de-centered approach to internal experience. Unlike traditional CBT exercises that attempt to change thoughts, in MBCT the focus is on acceptance rather than change. Since this is a relatively new intervention there is currently no network of qualified providers. Creators of the intervention recommend using their book, *The Mindful Way Through Depression*, and/or working with a teacher or therapist who incorporates MBSR or other mindfulness practices into their work for those interested in this approach [54].

Dialectical Behavior Therapy (DBT)

Originally developed through insight gained while working with patients who had suicidal ideation and borderline personality disorder, this treatment program is a modified CBT program, drawing from principals in behavioral science, dialectical philosophy and Zen meditation practice [55]. Therapists and clients work to balance change with acceptance. Traditional cognitive behavioral therapy helps the participant change inappropriate behaviors, thoughts and emotions, while mindfulness training helps to facilitate acceptance and change. Participants are asked to make a one year commitment to the therapy. There are several components to DBT therapy including individual psychotherapy, group skills training, and telephone consultations between sessions. Readers are referred to the DBT training manual for a more in depth review [40].

Clinical Applications of Mindfulness Specific to the Practicing Rheumatologist

While there is a growing body of evidence supporting the use of mindfulness training as an adjunct to conventional therapy for a variety of medical and psychological conditions, studies specifically examining this intervention in patients with rheumatologic conditions are limited. The discussion below highlights several clinical concerns that are frequently encountered by the practicing rheumatologist in which the mindfulness training may be beneficial.

Chronic Pain

Collectively, rheumatologic diseases have been classified to be the most prominent cause of chronic pain in the developed world [56,57]. Chronic pain is often associated with a multitude of challenges not only for the patient, but also the cadre of family, friends, and healthcare providers caring for them. Uncontrolled chronic pain can lead to poorer quality of life, disability, and psychosocial problems in patients with rheumatologic conditions[58]. While most health care providers are aware of the role the mind-body connection has in partially mediating chronic pain symptoms, many feel under-prepared and/or unqualified to make recommendations for therapeutic interventions intended to target this important, symptom modifying axis [59,60]. Despite the fact that a wide range of mind-body therapies have been shown to be effective for the treatment of chronic pain and the inclusion of these interventions into comprehensive treatment plans has been recommended by consensus panels, only 20% of patients with chronic pain report the use of such adjunctive therapies [61,62].

Cognitive behavioral therapy (CBT) is a widely utilized and accepted mind-body approach which utilizes cognitive restructuring to modify maladaptive thoughts and behaviors related to pain; however the overall reported effects sizes for CBT are generally small in patients with chronic pain [63,64]. Eliminating maladaptive thoughts may not be a realistic strategy in patients with rheumatologic conditions who suffer from chronic pain since most face continual daily reminders of their chronic medical problems. A more realistic approach may be the promotion of acceptance. Mindfulness-based approaches to pain management encourage participants to alter their relationships and reflexive, behavioral responses to these maladaptive thoughts through non-judgmental acceptance. Pain acceptance has been described as “a willingness to experience continuing pain without needing to reduce, avoid, or otherwise change it” [65]. Experienced mindfulness practitioners demonstrate reduced anticipation and negative appraisal of pain under experimental conditions [66]. Higher degrees of mindfulness in patients with chronic pain are related to lower self-reported pain, emotional distress, disability, and utilization of pain medication [67]. Lower degrees of mindfulness are related to greater distorted thinking about pain, specifically pain catastrophizing, characterized by rumination about pain, feelings of hopelessness, and exaggeration of pain-related symptoms [68].

Training in mindfulness, particularly through the use of MBSR, has been shown to be effective for the treatment of chronic pain originating from a variety of causes, although not all studies have shown positive results related to pain reduction [21-26]. A recent uncontrolled, observational study suggests that of participants enrolled in a community based MBSR training program who reported chronic pain, exhibit improvements in pain scores following completion of the course [49]. Participants with chronic neck/back pain and arthritis were most likely to have significant improvements in pain following the MBSR training, while those with fibromyalgia and chronic headache did not have significant improvement in self-reported pain, suggesting a potential role in certain patients with rheumatologic disease.

Some of the highest quality evaluations of mindfulness interventions in chronic pain have been in patients with rheumatoid arthritis, osteoarthritis, and fibromyalgia. After 8 weeks of training, self reported pain significantly improved in 144 participants with rheumatoid arthritis regardless of intervention (CBT vs. mindfulness training vs. disease education), although greater effects were seen with CBT and education compared to mindfulness training [69]. Mindfulness training did not positively impact subjects' perceived control over their pain, while CBT and education did show beneficial effects. The relative value of the treatments in patients with RA varied based upon depression history. Those with a history of

2 or more episodes of depression who completed mindfulness training were more likely to show improvements in pain coping self-efficacy, pain catastrophizing, and physician assessed joint tenderness and joint swelling. The data supporting the use of mindfulness in patients with pain due to osteoarthritis is less compelling. In two different heterogeneous groups of older adults with chronic low back pain, in which a large proportion of the participants attributed the cause of their pain to osteoarthritis, MBSR subjects report of pain was not significantly different from those in the wait-list control or educational control conditions [70,71]. Chronic pain self-efficacy and disability scores improved in both the mindfulness and educational control groups [71]. In the first randomized controlled trial of a mindfulness based intervention for women with fibromyalgia, significant improvements in pain were noted for those in the mindfulness group compared to the waitlist control condition [72]. Similar findings were noted in 58 women with fibromyalgia participating in a quasi-randomized trial. Self-reported pain scores, pain perception, and the ability to cope with pain improved following an 8-week MBSR training compared to the support control group immediately following the intervention. Improvements were maintained over a 3 year follow-up time period [73]. In contrast, Astin showed similar improvements in pain in subjects with fibromyalgia completing a mindfulness based movement class compared to those in an educational control group [74]. While no conclusive recommendations can be made regarding the use of mindfulness interventions as an adjunctive means to control pain in patients with rheumatologic conditions, these initial findings suggest mindfulness training does not cause harm.

Mental Health

The benefits of mindfulness training particularly on depression and anxiety have been repeatedly shown in a variety of populations, including in those with chronic medical conditions [5,75-78]. As discussed above, a more mindful awareness might buffer against the harmful influence of perceived stress on psychological well-being, particularly in people who are susceptible to poor psychological functioning. Similar to other populations, improvements in mood have been shown to occur following mindfulness training in patients with rheumatologic conditions. In patients with rheumatoid arthritis, immediately following MBSR training, there were no notable improvements in psychological distress or depressive affect; however, 4 months following the intervention, improvements in psychological distress, but not depression, were noted [46]. In a second study of patients with rheumatoid arthritis, positive affect improved for both those receiving CBT and mindfulness, but the greatest improvements in both negative and positive affect were seen in those with a history of 2 or more episodes of depression, suggesting that those with recurrent depression were most responsive to the mindfulness intervention [79]. Modest improvements in psychological distress have been shown following completion of mindfulness training in patients with fibromyalgia compared to controls [72]. In a group of 91 women with fibromyalgia, Sephton showed specific improvements in depression in those who had mindfulness training compared to controls [80]. Furthermore, mindfulness training in women with fibromyalgia has been shown to improve patients' sense of optimism and control over their life, which was related to lower depressive symptoms [81]. Mindfulness, combined with a movement intervention was shown to be as efficacious as an educational control group at improving symptoms of depression in subjects with fibromyalgia [74]. Observational data evaluating changes in depression and anxiety before and after MBSR training suggest that patients with fibromyalgia had small non-significant changes in psychological distress, while patients with arthritis had the largest improvements in psychological distress when compared with patients with other types of chronic pain [49]. Based upon the data, a significant amount of work still needs to be done to evaluate the impact of mindfulness training on mental health in patients with rheumatologic conditions. Given the high rates of clinically significant depression in patients with rheumatologic

disease, MBCT is a particularly appealing mindfulness approach for the rheumatologist given MBCT's proven track record for depression relapse prevention. MBCT has yet to be formally evaluated in a cohort with a specific rheumatologic disease. One word of caution to practitioners who may want to suggest mindfulness training as an adjunctive approach to a multidisciplinary care plan is that mindfulness interventions may not be appropriate for people who are actively suffering from acute clinical depression. It has been theorized that intensity of negative thoughts, poor concentration and restlessness that often accompany an episode of acute depression might make meaningful participation in mindfulness exercises difficult and uncomfortable. Developing the necessary attentional control skills may be difficult during a major depressive episode, although this long held belief has recently been challenged [82,83].

Immune function

Accumulating data suggests training in mindfulness meditation may also support improved physiological functioning. While the exact mechanisms remain unknown, it is hypothesized that mindfulness meditation may exert its favorable effects through a variety of pathways including decreased sympathetic activation and improved neuro-endocrine function, two pathways intimately coupled to immune function [84]. In a landmark study, Davison demonstrated that training in mindfulness meditation enhanced antibody production following the influenza vaccination in healthy adults [47]. Extending this work into conditions where immune dysfunction plays an important role, including cancer and HIV infection, has also yielded promising results. In patients with breast and prostate cancer, a shift away from a pro-inflammatory response, to a more anti-inflammatory response, following MBSR participation has been observed [17,18]. This shift away from a pro-inflammatory state was maintained at the 1 year follow-up time point in this cohort of breast and prostate cancer subjects as evidenced by a continued decrease in Th1 cytokine production [85]. In HIV positive individuals, notable increases in NK cell activity from baseline were noted following MBSR training [86]. In women with early stage breast cancer not undergoing chemotherapy, those who underwent MBSR training displayed a restoration of natural killer cell activity and improvement in cytokine profiles, while those in the control group continued to show immune function abnormalities [87]. The authors speculate that this favorable shift in immune function may be related to lower cortisol secretion in the MBSR group compared to the non-MBSR group. The relationship between improved psychological well-being and improved immune function is less clear, with some studies showing a positive relationship between the two and others showing no association [17,86,88]. While these findings are interesting, they are also preliminary, and require confirmation in larger populations. To date, little work has been done on the impact of mindfulness training in patients with rheumatoid arthritis or other rheumatologic conditions, and thus far, mindfulness training has not been shown to have a beneficial effect. Mindfulness training has not been shown to impact disease activity assessed using the Disease Activity Score (DAS) in 28 joints, which includes a measure of the erythrocyte sedimentation rate, or IL-6 concentrations [46,79].

Conclusion

Although historically mindfulness meditation is ancient, as described in this review, research in the field is in its early stages though, rapidly expanding in both quality and quantity. This is may be, in part, a response to a controversial AHRQ review that called into question the efficacy of meditation for improving health which cited the rigor of the current studies of meditation as generally poor [89]. None-the-less, it is clear that for many, mindfulness training can have powerful psychological and possibly physiological effects. Many questions remain unanswered and further investigation is warranted. Studies of mindfulness

do demonstrate that training leads to improved quality of life, including in patients with rheumatologic disease. Taking into consideration that decreased quality of life is common among people with chronic disease and given the generally benign nature of this behavioral intervention, it is perhaps surprising that it is not recommended more often by health care providers in all fields. The clinical importance of improved quality of life as a predictor of morbidity and mortality is debated, but it is difficult to not argue that part of our role as clinicians should be to encourage patients to optimally enjoy life despite chronic medical conditions. We are quickly learning through the power of biomedical research what other cultures have recognized for thousands of years: mindfulness meditation is a powerful tool that can foster improved coping and growth. There is a great deal more that we need to learn, but it seems certain that mindfulness-based interventions have a future in both Western medicine and society.

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