

# Various Yoga Practices Effective in Chronic Pain Management: A Mini-Review



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## Abstract

Yoga is a practice where the body and mind are connected through a series of exercises that require focus on many different areas of the individual practitioner. The various yoga styles and practices incorporate the mental, physical, social, spiritual, emotional, and intellectual experiences of the human body into one session regardless of the type of yoga. This multi-faceted practice makes yoga the ideal subject to study its effects on chronic pain. Pain that has persisted may no longer be the same as it was acutely and will certainly affect every physiological system as well as the psychological aspects and their combined effects on the individual. This may involve physical changes; atrophy of muscles, change in posture, decreased neuromuscular control and more. This may also involve changes in mood, personality, anxiety, depression, loneliness and isolation. The combination on the mind and body is physically debilitating. Current methods to address chronic pain include the prescription of pain-relieving medications at very high costs, and risks to the individual. This mini review of the literature seeks to shed light on the many ways in which yoga practice can address many of the aspects of chronic pain directly and on several levels.

**Keywords:** Yoga; Chronic pain; Mindfulness; Insular cortex; Pain experience; Opioids; Biopsychosocial; Neuroplasticity

**Abbreviations:** IASP: International Association for the Study of Pain; APS: American Pain Society; NIH: National Institutes of Health; NCCIH: National Centre for Complementary and Integrative Health

## Introduction

Chronic pain is a multi-faceted condition that is affecting more individuals and at alarming costs. The estimated expenditure in the United States from 2001 to 2017 has exceeded one trillion US Dollars and will likely cost an additional \$500 billion by 2020 according to an analysis by Altarum, a non-profit health research group [1]. Chronic pain affects people on many levels and must be viewed through a biopsychosocial lens to appreciate the complexity of treatment are only targeting one aspect of pain, with significant harmful side effects including abuse, addiction, and further increased healthcare costs. When understanding chronic pain as a combination of experiences and learned responses over an individual's lifetime comprised of feelings, emotions, thoughts, expectations, sensations, and memories, one can appreciate the mind-body experience that pain is. The International Association for the Study of Pain (IASP) defines pain as «an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage» as it was first published forty years ago in 1979 by IASP in their journal, PAIN. Of note, they have included the emotional experience and the “potential” tissue damage, as this is often lacking in chronic pain.

The IASP is currently seeking input regarding a new definition of pain as of August 7th, 2019: An aversive sensory and emotional experience typically caused by, or resembling that caused by, actual or potential tissue injury [2]. This new definition incorporates that the experience may “resemble” a previous injury as it is assimilated in the brain itself. The brain interprets signals from all areas of the body and relates the previous experiences and future expectations in its ability to learn. This process is called neuroplasticity and is explained by psychiatrist Norman Doige in his book *The Brain's Way of Healing* [3]. The human brain is a constantly changing organ and the mind-body connection cannot yet be adequately understood in its ability to explain chronic pain. The late Dr. John Sarno in his many books, explains the physical and emotional connections between the mind and the body. *The Divided Mind: The Epidemic of Mind-Body Disorders* sheds light on this topic since its publication in 2006 and in his earlier published works in mind-body healing previous to 1984 [4]. In this regard, the mind-body connection can be strengthened by the regular practice of yoga. Yoga aims to “unite” the body and mind in a holistic way along eight paths. These paths include ethics, moral and spiritual development, physical development and posture, breathing and

holding of breath, sensory control, concentration and alertness, meditation, devotion, ritual, scholarly work, service, and the attainment of inner peace [5]. Nandini Vallath reports a literal translation of yoga: In Bhagavat Gita VI 23, it [yoga] is described as “the discipline which severs the connection with that which causes suffering” [6]. This is an area of emerging research into the realm of chronic pain and the neuroplasticity of the human brain.

### Discussion

The American Pain Society (APS) published a press release in 2015 connecting yoga to chronic pain in a preventative and protective way. Dr. M. Catherine Bushnell of the National Institutes of Health (NIH) and National Centre for Complementary and Integrative Health (NCCIH) has proven that there are changes in the white and gray matter of humans with chronic pain, and separately, depression. She further shows that the brain volume of yoga practitioners has more gray matter than control subjects and that the specific areas of increased size are in the insular cortices. The insular cortex is directly involved in pain tolerance and modulation. The loss of gray matter from chronic pain and associated disorders such as anxiety and depression and the loss in function including memory impairment, emotional problems, cognitive functional decline are shown in the cerebral cortex, subcortical levels, and the insula. Increased insular size is also correlated with increased yoga practice. Bushnell continues, “Insula gray matter size correlates with pain tolerance, and increases in insula gray matter can result from ongoing yoga practice” [7]. “Practicing yoga has the opposite effect on the brain as does chronic pain” [7]. In a 2014 study published in *Cerebral Cortex*, researchers found that the yoga practitioners had more than double the pain tolerance as the control subjects. This correlated positively with both left and right increased gray matter volumes in the insular cortices. Further, the increase in gray matter left insular volume is positively correlated with duration of yoga practice in years [8].

Another strategy that may be effective in managing chronic pain involves the use of mental strategies. For example, most control subjects use distraction and ignorance of the pain to tolerate a cold pressor test. Experienced yoga practitioners use elements of their yoga practice in their management of the pain during testing. These included: relaxation, acceptance, mindfulness, breathing, focusing on the sensation, and an overall observation of the situation to tolerate the pain 66% longer than controls [8]. Many of the strategies mentioned here are developed in the eight-fold paths of yoga. Breathing and focus on the breath itself involves both the central and autonomic nervous systems and the sympathetic and parasympathetic pathways depending on how that practitioner may be using breathing to accomplish their goals. Holding of breath may stimulate sympathetic excitation, while maintaining control of the breath may strengthen their relationship with their body and mind. Focusing on the sensations of breathing and where in

the body the breathing is felt may further develop the mind-body connection.

By using a detached perspective to evaluate feelings and sensations during these exercises, the yogi develops strategies to manage emotions and sensations in daily interactions and experiences. Similarly, mindful meditation focuses on an awareness of the sensations and surroundings to allow the individual to step back and reframe the experience from another point of view [6,9]. Neuroplasticity works positively and negatively in the mind and body. The brain will compile the information incoming in ways that it has in the past. Some of the negative nociceptive stimuli have created a “pain map” in each situation. Yoga may be able to combat this negative experience with new wiring of the system to interpret the stimulus according to new information. The new information is gained through breathing, postures, muscle tension and relaxation, or stretching and holding a posture or pose. The mind-body connection is enhanced with positive experiences gained in yoga practice. The biopsychosocial aspects of chronic pain are further re-wired in a social environment such as a yoga studio or class.

The depression, isolation, anxiety, and fear associated with chronic pain may be ameliorated in entry-level or beginner yoga classes taught by reputable and experienced yoga instructors and therapists. Some of the aspects of chronic pain involve the kinesiophobia and fear of the pain itself. Successful completion of one part of a yoga class begins to alleviate some of this fear and increase the positive reinforcement of returning for another positive experience. Compliance is one of the most difficult aspects of physical therapy care after discharge and this is true of many studies that attempt to prove long term effects of yoga on chronic pain. Longer studies of three to six months duration show continued improvement in subjects maintaining yoga practice after the original intervention.

Results at 26 weeks showed that the yoga group continues to improve chronic lower back “bothersomeness” greater than education and exercise alone. The decrease in medications for chronic lower back pain was also significantly lower in the yoga groups at 26 weeks [10]. The evidence in support of yoga in the short term supports reductions in pain, improvements in functional capacity, and decreased pain-related disability [11-13]. In a meta-analysis of randomized controlled trials, Holtzman and colleagues found that “yoga’s general emphasis on strength, flexibility, breathing, and focused awareness may be more important than the specific sequence or type of yoga postures used in different styles [13]”. Many yoga practices involve a significant part of introspection or mindfulness [14]. In a meta-analysis of 30 randomized controlled trials, mindfulness meditation showed significant improvements in both mental and physical health-related quality of life, and depression [9,15]. An ideal program to help patients manage chronic pain requires interdisciplinary teamwork. Yoga may be an adjunct therapy to other non-pharmacological interventions in the grand scheme

of chronic pain management. This mini review agrees with the notion that clinical researchers, yoga experts, and clinicians and practitioners are not separately equipped to manage patients with chronic pain without significant consultation from each other. Using comprehensive team tactics, yoga can be successful in helping patients achieve greater levels of pain relief through mind-body connections and a biopsychosocial approach [16,17].

## Conclusion

In summary, this mini review supports the notion that yoga is an excellent therapy to address chronic pain itself, and the many comorbidities involved by facing each aspect of the syndrome directly. The new definition of pain and its complexity involving multiple body systems can be directly addressed in the ways that several yoga styles incorporate into each yoga practice. The mind-body connection that is strengthened in every yoga session results in physical changes in the brain, neuroplastic adaptations, and new pathways are created that actually over-ride existing pathways of pain and disability. The biopsychosocial approach in the very act of practicing yoga in a group under an experienced practitioner further adds to the breaking of the isolation, depression, and anxiety that other programs addressing chronic pain have yet to accomplish. While any one intervention is not likely adequate to completely eradicate a condition as complicated as chronic pain is, there is significant evidence in many areas of yoga practice that combat the many areas of chronic pain. Many randomized controlled trials, systematic reviews, and meta-analyses were reviewed in this paper and support yoga as an intervention in chronic pain management. A complete inter-disciplinary approach may be best to completely care for the individual with chronic pain. This team would include the patient and family, yoga instructor, physical therapist, and physician or medical specialist among others in the complete care for this population.

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