Chapter 10
Yoga Therapy:
An Overview of Key Research and the Underlying Mechanisms

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ABSTRACT

This chapter reviews the evidence supporting the efficacy of yoga therapy for wellness, and as an adjunct to standard care for a number of chronic conditions. The underlying mechanisms are explored, including the physiological and biochemical changes that have been observed in yoga practitioners. Yoga has been found to activate the relaxation response—a physiological state which reduces stress on bodily systems. Yoga leads to changes in gene expression, including decreases in the expression of genes involved in stress and inflammation. The positive effects of yoga therapy are interpreted through the lens of the biopsychosocial-spiritual model, which cultivates eudaimonic well-being and salutogenesis. Researchers attribute a wide range of yoga's therapeutic benefits largely to its whole-person approach to well-being.

INTRODUCTION

This chapter provides an overview of the research supporting the therapeutic benefits of yoga for health promotion, and as an adjunct to standard care for the treatment of a number of common physical and mental health conditions (MHCs). It also explores the underlying physiological mechanisms. A key mechanism behind yoga's benefits is that yoga reduces extraneous load from stress on the body's systems. The extra load is due to the fact that the body has to work harder to maintain homeostasis, taxing

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the organs and systems and contributing to chronic disease. Allostasis, a term often used in integrative healthcare, refers to the physiological changes which a living organism undergoes in order to maintain homeostasis during stress (Sterling & Eyer, 1988). The stress response is mediated by the regulated release of hormones and other chemical messengers by the neuroendocrine system. During real or perceived threats an individual undergoes several adaptations prompted by the activation of the sympathetic nervous system (SNS) in which a cascade of neurophysiological and metabolic shifts occurs to maintain homeostasis. This response is adaptive to the organism following an acute stress, and maladaptive under conditions of chronic stress, referred to as allostatic overload, which may lead to various comorbid physical or mental health diseases.

The whole-person approach of yoga therapy, which looks at individuals through a biopsychosocial-spiritual lens known in the yoga tradition as the *pañcamaya* (five layers of being) model acts through neurophysiological mechanisms that lead to psychological and eudaimonic well-being. The accessibility and adaptability of the top-down and bottom-up approaches of yoga allow for self-regulation of the nervous system, thereby reducing allostatic load. Top-down strategies derive from or are influenced by frontal brain regions and cognitive function and bottom-up approaches are derived from the emotion generative regions of the brain and are influenced by peripheral sensory afferents (Gard et al., 2014). In the practices of yoga, top-down may include meditation, attention-controlled practices, ethics, and monitoring while bottom-up may include sustained *asana* (movement) and *pranayama* (breath) practices. The research highlighted in this chapter discusses the utility of yoga as a therapeutic intervention and model for health.

MUSCULOSKELETAL AND NEUROLOGICAL HEALTH

It is well-accepted that physical exercise greatly benefits health, including improved range of motion, flexibility, strength, and balance - all of which improve outcomes in therapeutic populations. Although yoga *asana* offers a form of physical exercise, the whole practice of yoga differentiates from other commonly recommended exercises due to additional tools including breath regulation, moment-to-moment awareness, and the integration of philosophical teachings. This whole-person approach to well-being makes yoga particularly well-suited for complex musculoskeletal and neurological-based chronic diseases.

Yoga *asana* seems to have positive effects on joint and skeletal health. A meta-analysis of 10 randomized controlled trials (RCTs) with 967 participants concluded that yoga may be effective for improving pain, function, and stiffness for those with osteoarthritis of the knee (Lauche et al., 2019). Yoga shows promise for other musculoskeletal and neurological concerns and conditions. A systematic review found that yoga improved balance in healthy individuals (Jeter et al., 2014), and smaller studies demonstrated improvements for those in stroke recovery (Schmid et al., 2012), older adults with a history of falling (Ni et al., 2014), and individuals with Parkinson's disease (Van Puymbroeck et al., 2018). Other studies showed outcome improvements with yoga for specific conditions such as rheumatoid arthritis and osteoarthritis (Moonaz et al., 2015), osteoporosis (Lu et al., 2016), rotator cuff dysfunction (Fishman et al., 2011), sciatica and disc herniation (Monro et al., 2015), scoliosis (Fishman et al., 2014), hyperkyphosis (Greendale et al., 2009), fibromyalgia (Carson et al., 2010) and headaches (Bhatia et al., 2007; Kim, 2015; Vasudha et al., 2018). However, these studies are small and more research and systematic reviews are needed in all of these areas.