

*Abstract*

## **Tai Chi Movement Analysis Towards Depression Treatment Development: A Traditional Chinese Medicine and Biomechanical Approach**

by Jacqueline C. Shin<sup>1</sup>, Heather Abbott<sup>2</sup>, Hwa-Jin Lee<sup>3</sup>, Hee-Joon Park<sup>4</sup>, Jong-Woo Kim<sup>4</sup>, Seok-In Yoon<sup>5</sup> and Hyo-Won Seo<sup>5</sup>

<sup>1</sup>Department of Psychology, Indiana State University

<sup>2</sup>Department of Kinesiology, Recreation, and Sport, Indiana State University

<sup>3</sup>Korean Medicine Dance Therapy Research Center, Seoul, Korea

<sup>4</sup>Department of Korean Medicine, Kyunghee University, Seoul, Korea

<sup>5</sup>Korean Medicine Mental Health Center

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Tai Chi, an ancient Chinese martial art and health exercise, has received much attention from the biomedical community as a promising therapy for mental health issues, such as depression and anxiety, as well as a wide range of chronic illnesses, including cardiovascular disease, pulmonary disease, diabetes, arthritis, cancer, and chronic pain. Tai chi also facilitates neuroplasticity and holds substantial treatment potential related to dementia and neurodegenerative diseases, such as Parkinson's disease and Alzheimer's disease. Despite the generally positive clinical results and psychoneuroimmunological benefits of Tai Chi, developing Tai Chi into medical treatment regimens remains challenging due to a) the high variability in the health outcomes of Tai Chi, b) the lack of standards for effective Tai Chi practice, and c) the complexity of Tai chi movements and the consequent difficulty for learning and execution. Thus, it would be imperative to elucidate mechanisms of the

mind-body activities characterizing effective Tai Chi practice for developing simplified Tai Chi routines tailored to specific clinical populations with maximal health benefit.

Towards these goals, we closely examined Tai Chi movements and practice methods based on Traditional Chinese Medicine (TCM) and Daoist principles—foundations that have driven the creation and development of Tai chi for hundreds of years. In the work that we presented here, specific Tai Chi movements were analyzed in terms of their contribution to the stimulation of the Twelve Regular Meridians, each of which are postulated in TCM as major pathways through which vital energy, known as Qi, flows and supports organ system functions. Importantly, this work was based on biomechanical analysis. In addition to the methods and outcomes of this analysis, the potential for this work in developing specific treatments for depression were discussed.

*Keywords: Tai Chi, movement analysis, Traditional Chinese Medicine, meridians, biomechanics*