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“Effects of Tai Chi on Cognitive and Neurological Outcomes in Adults With Type 2 Diabetes Mellitus: A Systematic Review of Randomized Controlled Trials”

Research Objective(s): Type 2 diabetes mellitus (T2DM) is associated with cognitive decline, diabetic peripheral neuropathy, impaired somatosensory function, and increased fall risk. Tai Chi has demonstrated potential neuroprotective and neuromodulatory effects; however, its impact on cognitive and neurological outcomes in adults with T2DM has not been systematically synthesized. This review evaluated evidence from randomized controlled trials (RCTs) examining the effects of Tai Chi on cognitive and neurological outcomes in adults with T2DM.

Data Sources: PubMed, Embase, CINAHL, Scopus, Web of Science, Cochrane Library, and selected Chinese databases were searched from January 2011 through May 2026.

Study Selection: Eligible studies were RCTs involving adults with T2DM that evaluated Tai Chi interventions and reported cognitive, neurological, neuromotor, or neuroimaging outcomes.

Data Extraction: Two reviewers independently extracted study characteristics, interventions, outcome measures, and findings.

Data Synthesis: Five RCTs involving approximately 427 participants met inclusion criteria. Three studies involving 328 participants evaluated central neurological outcomes and demonstrated improvements in global cognition, executive function, attention, and visuospatial performance among older adults with T2DM and mild cognitive impairment. Cognitive benefits were maintained for up to two years following intervention. Two neuroimaging studies involving cohorts of 99 and 130 participants demonstrated enhanced brain network efficiency, improved functional connectivity, and altered activation within prefrontal and motor cortical regions, suggesting neuroplastic adaptations associated with Tai Chi practice.

Three studies involving approximately 96 participants evaluated peripheral neurological outcomes and reported improvements in diabetic neuropathy symptoms, peripheral somatosensory function, proprioception, balance, and postural control. One study involving 59 participants demonstrated reduced neuropathy symptom severity, while two studies involving approximately 37 participants reported improved somatosensory function and proprioception. All three balance-related studies demonstrated improvements in balance performance, postural stability, and neuromotor control.

Collectively, the evidence supports a multilevel rehabilitation model in which Tai Chi influences both central and peripheral neurological function. Improvements in brain network organization and cognition appear to complement gains in sensorimotor processing and postural control,

suggesting that Tai Chi may address interconnected neurological impairments commonly observed in adults with T2DM.

Conclusions: Emerging RCT evidence supports Tai Chi as a promising rehabilitation intervention for improving cognitive and neurological outcomes in adults with T2DM. Benefits appear to extend beyond glycemic control and may involve neuroplastic adaptations affecting cognition, sensorimotor integration, and balance. Additional high-quality RCTs are needed to confirm these findings.