PSYCHOGERIATRIC NOTE

Tai chi for mild cognitive impairment: a systematic review

Mild cognitive impairment (MCI), an intermediate stage between normal cognitive aging and dementia, is defined as cognitive decline greater than expected for a person’s age and education level that does not significantly interfere with activities of daily life.\(^1\) Up to approximately 80% of people with MCI may progress to dementia within 5 years.\(^2\) Tai chi (TC) as a gentle aerobic exercise has been shown to provide benefits in the treatment and rehabilitation of many medical conditions. Practising TC may improve cognitive function. However, few randomized controlled trials (RCTs) have examined the effects of TC on MCI, and they have done so with controversial results.\(^1,3,4\) We conducted this systematic review of RCT to investigate the efficacy of TC for individuals with MCI.

In this study, the selection criteria used were based on PICOS:\(^5\) P, participants (persons with MCI according to any diagnostic criteria); I, intervention (TC monotherapy or TC combined with other interventions, such as a memory intervention programme); C, comparison (placebo or other interventions); O, outcomes (cognitive function); and S, study design (RCT). The primary outcome measure was cognitive function as assessed by standardized scales, such as the Alzheimer’s Disease Assessment Scale-cognitive subscale, the Wechsler Adult Intelligence Scale or the Mini-Mental State Examination.

PubMed, PsycINFO, EMBASE, Cochrane Library, Chinese databases (WanFang Database, Chinese Biomedical Database, and China Journal Net), and the Cochrane Controlled Trials Register were searched from inception of the database until 7 February 2016. The following search terms were used: (Tai-jí OR Tai Chi OR Chi, Tai OR Tai JiQuan OR JiQuan, Tai OR Quan, Tai Ji OR Taiji OR Taijiquan OR T’ai Chi OR Tai Chi Chuan) AND (Cognitive Impairment*, Mild OR Impairment*, Mild Cognitive OR Mild Cognitive Impairment*). Two authors independently conducted the original search, study selection, data extraction, and quality assessment. Any inconsistencies were resolved by discussion. The quality of each study was assessed with the Jadad scale, and the criteria for high and low quality were defined as a Jadad score ≥3 and <3, respectively.

The systematic search yielded 56 potentially relevant articles, and eventually only three RCT fulfilled the study inclusion criteria and were included.\(^1,3,4\) The TC styles were 24 style (30 min, 3x/week),\(^4\) Yang style (60 min, 2x/week),\(^3\) and Taoist style (90 min, 2x/week),\(^1\) whereas the control group participated in a memory intervention programme (one RCT),\(^4\) their usual daily activities (one RCT),\(^3\) and stretching and relaxation exercises (one RCT).\(^1\) The dropout rate in the TC group ranged between 0% and 46.2%. Two RCT were classified as high quality, and one RCT was classified as low quality (Table 1).

Lam \(\text{et al.}\) found that TC was superior to the control conditions (effect size = 0.22) on cognitive function performance as measured by the Clinical Dementia Rating,\(^4\) but there was no difference on the Alzheimer’s Disease Assessment Scale-cognitive subscale, Mini-Mental State Examination, and digit-span-backward, visual-span-backward, delayed recall, and category verbal fluency tests. In addition, no significant differences were found with regard to social function, depressive symptoms, neuropsychiatric symptoms, and balance. In the study by Kasai \(\text{et al.}\),\(^3\) participants in the TC group performed significantly better than controls on the Rivermead Behavioral Memory Test (effect size = 0.48) and the Subjective Memory Complaint Scale (effect size = 0.31), but no significant difference was measured regarding digit span forward and backward as assessed by the Wechsler Adult Intelligence Scale. Fogarty \(\text{et al.}\) found that TC could effectively prevent deterioration by applying memory strategies, and it improved processing speed, visual attention, and general physical health compared to the results of the control group.\(^1\)

This systematic review found that TC is beneficial for cognitive function according to the results of the Clinical Dementia Rating, the Rivermead Behavioral Memory Test, and the Subjective Memory Complaint Scale. It is useful in maintaining memory strategies...
<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>N</th>
<th>Blinding</th>
<th>Setting</th>
<th>Trial duration (months)</th>
<th>Country</th>
<th>Diagnosis</th>
<th>Diagnosis criteria</th>
<th>Participants, Age, (range)</th>
<th>Male participants, n (%)</th>
<th>Interventions (number of patients)</th>
<th>TC intervention frequency</th>
<th>Outcome measurements</th>
<th>TC dropout rate (%)</th>
<th>Jadad score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kasai et al.</td>
<td>Trial</td>
<td>26</td>
<td>Masked</td>
<td>NR</td>
<td>6</td>
<td>Brazil</td>
<td>MCI</td>
<td>DSM-IV</td>
<td>74.0 (±60)</td>
<td>0 (0%)</td>
<td>TC (n = 13)</td>
<td>Usual daily activities; (n = 13)</td>
<td>60 min, 2×/week (Yang style)</td>
<td>WAIS, RBMT, SMC</td>
<td>6.7</td>
</tr>
<tr>
<td>Lam et al.</td>
<td>Open</td>
<td>389</td>
<td>Masked</td>
<td>NR</td>
<td>12</td>
<td>China</td>
<td>MCI</td>
<td>CDR</td>
<td>77.8 (±65)</td>
<td>92 (24%)</td>
<td>TC (n = 171)</td>
<td>Stretching and relaxation exercises (n = 218)</td>
<td>30 min, 3×/week (24 style)</td>
<td>ADAS-cog, BBS, CSDD, CDR, CVF, DAD, WAIS, DR, NPI, MMSE, VS</td>
<td>46.2</td>
</tr>
<tr>
<td>Fogarty et al.</td>
<td>Open</td>
<td>40</td>
<td>Outpatients</td>
<td>NR</td>
<td>5</td>
<td>Canada</td>
<td>MCI</td>
<td>amMCI</td>
<td>72.1 (NR)</td>
<td>19 (40%)</td>
<td>MIP + TC (n = 22)</td>
<td>MIP (n = 18)</td>
<td>90 min, 2×/week (Taoist style)</td>
<td>DTC, HVLT, RAPA, RBMT, SF-36, TEA, UG, WAIS</td>
<td>0</td>
</tr>
</tbody>
</table>
and physical health, as well as in processing speed and visual attention. A meta-analysis of 12 RCTs examined the effects of TC on global cognitive function in a mixed population with cognitive impairments ranging from MCI to dementia and found significant beneficial effects ($P = 0.004$) in the TC group compared to controls,6 which is partly consistent with the findings of the present study.

According to traditional Chinese medicine, TC, which encompasses breathing (chi) and physical movements, creates physical, emotional, and spiritual balance and enhances self-fulfilment and self-realization. Some studies found that aerobic exercise may increase Brain-derived neurotrophic factor expression in the hippocampus and perihippocampal regions,7 which may be associated with the effect TC on cognition. This systematic review found that TC treatment has certain beneficial cognitive benefits for MCI.

Wei Zheng,1 Ying-Qiang Xiang,2 Gabor S. Ungvari,3,4 Helen F.K. Chiu,5 Yu-Ping Ning,1 Xin Yu,6 Brent P. Forester7 and Yu-Tao Xiang8

1Department of Psychiatry, The Affiliated Brain Hospital of Guangzhou Medical University (Guangzhou Huai Hospital), Guangzhou, 2Department of Psychiatry, The National Clinical Research Center for Mental Disorders (Beijing Anding Hospital), Beijing Institute for Brain Disorders, Capital Medical University and Center of Depression and 4Institute of Mental Health, Peking University, Beijing, 5Department of Psychiatry, Chinese University of Hong Kong and 8Unit of Psychiatry, Faculty of Health Sciences, University of Macau, Macau, China, 1Marian Centre, The University of Notre Dame Australia and 6School of Psychiatry and Clinical Neurosciences, University of Western Australia, Perth, Western Australia, Australia and 7Division of Geriatric Psychiatry, Department of Psychiatry, Harvard Medical School, McLean Hospital, Belmont, Massachusetts, USA

REFERENCES

3 Kasai JY, Busse AL, Magaldi RM et al. Effects of Tai Chi Chuan on cognition of elderly women with mild cognitive impairment. Einstein 2010; 8: 40–45.