Appendix 1

Patients

All the subjects were recruited from the First Affiliated Hospital of Nanjing Medical University through newspapers, phone calls and the memory disorder outpatient clinic during the period from June 2014 to December 2016. The implementation process of the entire project was supervised by the Ethics Committee of the First Affiliated Hospital of Nanjing Medical University. If an elderly person with memory complaints met the following inclusion and exclusion criteria, he/she was enrolled in this study.

The subjects were required to fulfill all of the subsequent inclusion criteria: (I) age ranging from 50 to 85 years; (II) complaint of memory decline for more than 3 months; (III) met diagnostic criteria of amnestic mild cognitive impairment provided by the guidelines of National Institute of Aging and Alzheimer's Association (NIA-AA) (24); (IV) achieved the Mini-Mental State Examination (MMSE) score ≥25 (28) and the Montreal Cognitive Assessment (MoCA) score ≤26 (29); (V) had a Hachinski Ischemic Score (HIS) ≤ 4 (60); (VI) consent to participate in this study and sign the informed consent form.

The exclusion criteria included: (I) The population diagnosed with vascular dementia according to the standards formulated by the National Institute of Neurological Disorders and Stroke and the Association Internationale pour la Recherche et l'Enseignement en Neurosciences; (II) Hachinski Ischemic Score >4; (III) inability to complete cognitive assessment and magnetic resonance examination due to diseases, such as dentures in the mouth and internal metal fixators; (IV) recent use of medications affecting cognitive function within 6 months prior to enrollment; (V) presence of psychiatric problems, such as severe depression and anxiety disorders; (VI) medical contraindications for exercise, such as heart failure, frequent premature beats and orthopedic diseases; and (VII) had the habit of dancing for many years.

Interventions

The aerobic dance intervention group

The intervention group performed a moderate-intensity aerobic dance training, 35 minutes each time, three times a week. The intervention cycle lasted for a total of 3 months. The target heart rate throughout the training process needed to reach 60–80% of the maximum heart rate. Maximum heart rate was obtained by ECG exercise test completed at enrollment. The total aerobic dance time is 25 minutes. Subjects wore a heart rate monitor on their left wrists during the whole dance class using the cardiotachometers (ONrhythm 50, GEONATURE). The dance routine included warm-up, aerobic dance, and cool-down pgase. During 3-month intervention period, the exercise group was required to perform repeated aerobic dance learning for the first 2 weeks and then enter formal aerobic dance training. The aerobic dance routine involved seven sub-sessions, such as namely, knee bending, heel up, boxing, shoulder movement, kicking, square-stepping, and sculling exercises (https://www.youtube.com/watch?v=WuIv1enhtL0). During the entire training process, the subjects were required to keep their attention focused, remember all the segmented movements, and complete the training correctly. The dance group also received a 120-minute health education program when they were enrolled. This health education project included the prevention of risk factors for dementia, the structure of the Mediterranean diet, how to choose a healthy lifestyle, as well as insomnia management. Participants were followed up by phone every week and were contacted to remind the key points of the education program.

References

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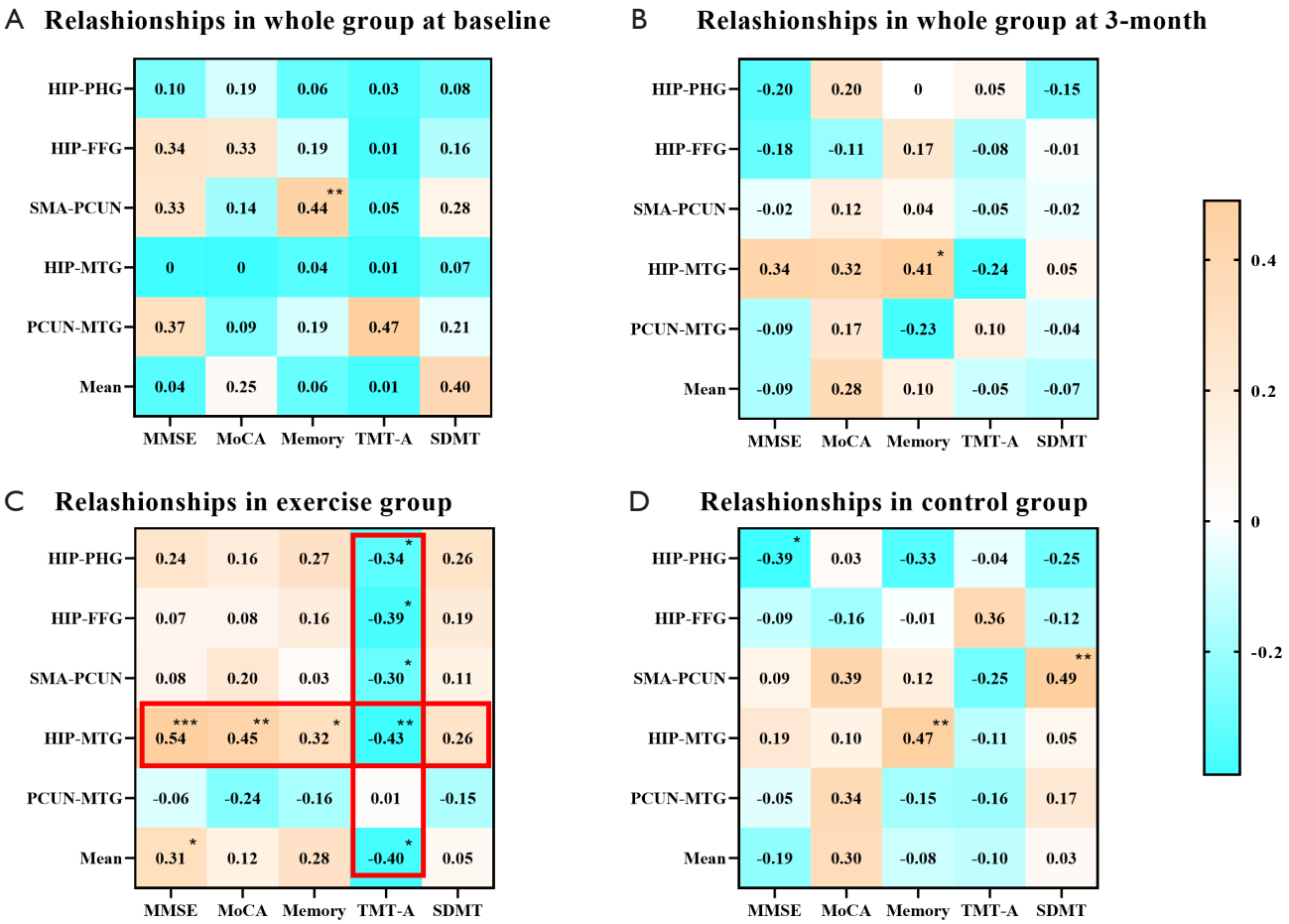

Figure S1 Correlation heatmap of structural connections strength and cognition performance. (A) Correlational analyses between neuropsychological tests and structural connections in the whole group (CG+EG) at baseline. (B) Correlational analyses between neuropsychological tests and structural connections in the whole group (CG + EG) at 3 months. (C) Correlational analyses between neuropsychological tests and structural connections in which significant changes after aerobic dance were detected in the exercise group. There were significant positive and negative correlations between mean structural connections with MMSE (R=0.31, P=0.04) and TMT-A (R=–0.40, P=0.011), respectively. (D) Correlational analyses between neuropsychological tests and structural connections in which significant changes were detected at 3 months in the control group. *, P<0.05; **, P<0.01; ***, P<0.001.

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