

## Acupuncture and Moxibustion Treatment for Early Detection of Dementia

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Dementia has the problem of requiring nursing care when it develops. Therefore, early detection of dementia, control of its progression, and prevention of its onset are important. Although 78% of respondents are concerned about dementia, only 28% are taking steps to prevent dementia. Efforts for taking steps to prevent dementia are only 19% among those in their 40s and 55% among those in their 70s. On the other hand, 74% are interested in lifestyle and 64% are interested in diet in order to prevent dementia, which suggests that attention to this issue is high. After the onset of dementia, treatment with pediatric acupuncture is expected to help dementia patients stabilize mentally and reduce problematic behaviors [1]. Although there is no clear evidence, the effects of acupuncture on central nervous system (CNS) disorders are evident. By directly approaching CNS disorders, acupuncture treatment for dementia may have potential.

To prevent dementia, it is necessary to detect Mild Cognitive Impairment (MCI), a pre-dementia stage, and prevent cognitive decline before it occurs. MCI is a

condition in which cognitive functions such as memory and attention decline, but not to the extent that they interfere with daily life. Initially, Smith and Peterson et al. examined the memory of people who were aware that they had trouble remembering, a form of MCI, and defined them as those who differed more than 1.5 times the standard deviation of values for the same age group [2]. Currently, the classification proposed by a symposium in Stockholm is used [3]. The classification is made into two groups: amnesic MCI, those who complain of cognitive decline but are not normal and not have dementia and have memory impairment, and non-amnesic MCI, those who do not have memory impairment.

Since 40-50% of people with MCI will return to normal, early detection of cognitive decline is necessary. Early detection of MCI and early intervention are therefore important. Amyloid Positron Emission Tomography (PET) is mainly used for early detection of MCI. Biomarkers and brain atrophy measurements are also used. For early detection of MCI, behavioral indicators are also used. Behavioral

indicators, including the Nagoya University Cognitive Assessment Battery (NU-CAB) and the Mini-Mental State Examination (MMSE), are used as the cognitive function screening tests that utilize group medical examination of residents. The Tokyo Metropolitan Institute of Gerontology Index of Competence (TMIG) and the Observation List for Early Signs of Dementia (OLD) can also be utilized for daily dementia screening.

Cognitive function declines with age, including short-term memory, behavioral memory, long-term memory, and processing speed. It is important to increase cognitive reserve and brain reserve to prevent the development of dementia even as cognitive function declines. If cognitive reserve is large, early detection of functional decline is important, but if it is small, early intervention is needed, such as with medication. Intervention should prevent further decline in cognitive reserve and prevent the onset of dementia [4]. Cognitive reserve is thought of as the quantity and quality of the brain's neural networks. People with higher education, people in intellectual occupations, and those who need to take on new challenges have more active neural networks in the brain and higher reserve capacity. As a result, even if brain damage or aging occurs, function is compensated because another neural network is available. Therefore, the more neural networks, the less susceptible to dementia and the higher the cognitive reserve. Factors that decrease cognitive reserve include heredity, socioeconomic factors, and lifestyle habits such as high blood pressure and smoking. Factors that improve cognitive reserve include higher education, anti-hy-

pertensive medication, rich interpersonal relationships, and intellectual activity [5].

To improve cognitive reserve, cognitive approaches are used to strengthen the brain's neural networks and prevent brain atrophy. Interpersonal contact and intellectual activities are important for strengthening the brain's neural networks. In terms of interpersonal contact, the more interpersonal interaction, the more cognitive function can be preserved. If a person has a goal in life and has a purpose in life, he or she is less likely to develop dementia. People who are active and outgoing have higher cognitive function [6]. In intellectual activities, leisure activities such as playing musical instruments or dancing are better than brain drills that involve reading texts. It is important to use the brain for more than just calculations or reading books. To improve brain reserve, improved eating habits and exercise are important. In terms of eating habits, the accumulation of amyloid beta protein should be inhibited. Good foods include fish, olive oil, nuts, and polyphenols from wine. In terms of exercise, the more one exercises, the better, because cerebral blood flow in the areas associated with the frontal lobes increases in people who exercise. The higher the cerebral blood flow, the less likely it is for nerve cells to drop out, thus limiting brain damage. Moderate exercise from a young age improves physical abilities such as muscle, bone, and visceral organ function. Because musculo-motor and visceral functions are interconnected, it is important to continue daily activity from middle age to delay aging [7].

In order to realize successful aging, avoidance of disease and disease-related impaired ability, active involvement in life, and maintenance of cognitive and physical functioning are important [8]. Not only health maintaining, socioeconomic status securing, and presence of family but also subjective well-being are also important. Increasing subjective well-being requires joy and satisfaction in life, vitality and challenge in life, and peace of mind and distraction. Acupuncture and moxibustion treatment are being studied for early detection of cognitive decline. In cerebrovascular dementia, extensive white matter involvement has been implicated as a contributing factor [9]. Overactive bladder occurs even when white matter lesions are as small as grade 1 with a diameter of less than 3 mm. When the white matter lesions fuse and enlarge, reaching grade 4, cognitive impairment occurs. Therefore, the utilization of the development of overactive bladder is attracting attention [10]. The suppression of cognitive decline by acupuncture and moxibustion treatment has also been investigated. It has been reported that free testosterone decreases in Alzheimer's disease [11]. In addition, it has been reported that synthesis of testosterone in the hippocampus [12] and testosterone in the blood [13] are increased by exercise required to improve cognitive reserve. About 7 hours of sleep is required to suppress the decrease in testosterone [14]. In the examination using rats, needling onto the sacrum, which involves periosteal stimulation near S2 and S3, has been shown to deepen sleep [15]. Improved sleep is expected to reduce the decrease in testosterone and improve cognitive reserve [10].

In discussion, the prevention of MCI is discouraged. People who are tested for dementia prevention or come to health classes will be those who are highly aware of the disease. In order to prevent dementia, it is important to test those who are not highly conscious. During acupuncture and moxibustion treatment, it is necessary to detect attention disorders in patients in order to detect MCI at an early stage. There has been reported a patient with attention disorder, who bring slippers without walking in them when they enter the treatment room. Observe the patient carefully, detect attention disorders, and collaborate with family members and medical institutions as necessary. A positive lifestyle is important in the prevention of MCI. Acupuncture and moxibustion treatment helps patients to lead a positive life by improving pain and other complaints. Lifestyle guidance can prevent MCI through improved eating habits and exercise routines. Since bragging and meeting others are important for improving cognitive reserve capacity, it is also important to listen to and accept bragging during acupuncture treatment. Patients can continue to enjoy their lives by having fun with bragging. It is important to help patients to continue to maintain high cognitive reserve and lead a good life.

Regarding the early detection of MCI through acupuncture, the use of overactive bladder detection is considered [10]. With aging, lesions of white matter, degree of cognitive impairment, and symptoms of overactive bladder progress simultaneously. On the other hand, even if there is an association between white matter lesions and the degree of cognitive impairment and if there is an association

between white matter lesions and overactive bladder symptoms, it is difficult to link the development of MCI and overactive bladder. A logical causal relationship must be found between cognitive impairment and overactive bladder. At the time of consultation, the acupuncturist may pay attention to the early detection of MCI when overactive bladder is present, but cannot suggest MCI to the patient. It is expected that a direct causal relationship between MCI and overactive bladder will be found in the future. It is also desirable to verify whether there is a significant difference in the progression of MCI between patients with and without overactive bladder.

In terms of acupuncture and moxibustion treatment for MCI, the effectiveness of pediatric acupuncture for patients with dementia was reported [1], but it is expected that not only pediatric acupuncture but also general acupuncture and moxibustion is effective in MCI. Effects such as moderate exercise, blood flow improvement, dietary habit improvement, nutritional management, intellectual life, rich interpersonal relationships, subjective well-being, good sleep, and stress reduction are expected for the prevention of MCI. In the same factors which affect reproductive hormones, there are exercise, diet, sleep, and stress. Since MCI and reproductive hormone preventive factors overlap, those who are proactive in improving these preventive factors may improve both MCI and reproductive hormones. Because improvement of these preventive factors can be achieved with acupuncture and moxibustion treatment, prevention of MCI by acupuncture and moxibustion treatment is expected. The

anterior pituitary gland is involved in the development of the genital organs and influences reproductive hormones such as testosterone. Acupuncture treatment related to the anterior pituitary gland has been reported on KI11 [16]. A 10-mm needle prick affects the male genital organs and acts on testosterone. Acupuncture treatment on KI11 and BL52 have also been reported that act on the anterior pituitary gland and have an effect on testosterone [17]. It should be noted, although a decrease in reproductive hormones during cognitive decline has been reported, however, that there is no evidence that an increase in reproductive hormones improves cognitive decline.

Improvement of sleep and stress is also important in the prevention of MCI. Periosteal stimulation near on BL33 was reported to suppress overactive bladder [18] as well as deepen sleep [10]. It should be noted, however, that sleep deepening is not limited to periosteal stimulation near BL33, as general acupuncture and moxibustion treatment also improves sleep conditions. On the other hand, since stress reduction is expected by suppressing overactive bladder, prevention of MCI is expected through treatment of overactive bladder by acupuncture and moxibustion stimulation onto the sacrum, including not only BL33 but also BL32. In the prevention of MCI, not only treatments related to reproductive hormones, sleep, and stress, but also general acupuncture and moxibustion treatments are expected to be effective.

In summary, early detection and intervention of MCI are important for early detection, control of its progression, and

prevention of dementia. Behavioral measures such as NU-CAB, MMSE, TMIG, and OLD are used. It is important to increase cognitive reserve and brain reserve to prevent the development of dementia even as cognitive function declines. Interpersonal contact, intellectual activity, eating habit, and exercise are important to improve these reserves. It is effective to increase the neural network through interpersonal contact and intellectual activities. During acupuncture and moxibustion treatment, it is necessary to detect attention disorders in patients in order to detect MCI at an early stage. Acupuncture and moxibustion treatment helps patients to continue to maintain high cognitive reserve and lead a good life. A positive lifestyle is important in the prevention of MCI. Acupuncture and moxibustion treatment helps patients to lead a positive life by improving pain and other complaints. Lifestyle guidance can prevent MCI through improved eating habits and exercise routines. In the prevention of MCI, not only treatments related to reproductive hormones, sleep, and stress, but also general acupuncture and moxibustion treatments are expected to be effective.

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