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Original Article

Tai Chi in combination with acupoint massage can improve sleep quality of elderly patients with chronic insomnia

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Abstract: Objective: This study aims to observe the effect of Tai Chi exercise on improving elderly patients with chronic insomnia under the auxiliary treatment of the acupoint stimulation. Method: 90 elderly patients with chronic insomnia were randomly divided into a Tai Chi exercise group, an acupoint massage group and a combination group. The patients in Tai Chi group did Tai Chi exercise for treatment. Those in the acupoint massage provided only the massage for treatment while patients in the combination group did Tai Chi exercise under the auxiliary treatment of the acupoint massage. SPIEGEL sleep scale, Exon emotional stability scale and life quality questionnaire were used to respectively detect and compare three groups of patients so as to observe the curative effect before treatment and after 3 months' treatment. 3 groups of the cure patients were respectively followed up and interviewed for 6 months and the recurrence rate was compared. Results: After 3 months' treatment, all detection indexes for 3 groups of the patients were improved to some extent and the curative effect of the combination group was more significant. Compare with other two groups in the same time point after 3 months' treatment, $P < 0.05$; the clinical cure rate and total effective rate of the combination group are significantly higher than other groups, $P < 0.01$ or $P < 0.05$; After 6 months follow-up, we found that the recurrence rate were 37.50% in Tai Chi group, 33.33% in acupoint massage group and 23.08% in the combination group. Recurrence rate of the combination group is significantly lower than that of other groups, $P < 0.05$. Conclusion: after 3 months Tai Chi exercise, their physical and mental state and sleep quality of elderly patients were significantly improved. The combination of acupoint massage further improved the effect of Tai Chi.

Keywords: Old people, insomnia, Tai Chi, acupuncture points, combination, curative effect

Introduction

Insomnia is also known as sleep initiation and maintenance disorder and it refers to a subjective experience in which the insufficient sleep time and/or quality of the patients can influence their daytime social function. In the sleep process, the patients often suffer from sleep difficulties, light or infrequent sleep, early awakening and insufficient time or poor quality of sleep. It can be divided into acute, sub-acute and chronic sleep; and chronic insomnia is a common disease of the old people. Patients may feel physically and mentally tired due to long-term insomnia. The patients with serious insomnia may suffer from anxiety disorders and other psychological diseases, which seriously affect their physical and mental health and their daily life quality. The disease is related to the physiological function and psychological factors of the old people [1, 2]. Patients with acute and sub-acute insomnia are treated with drugs, while for the patients with chronic insomnia, the cycle of their disease cycle and time for their treatment often last. Except for the patients with serious chronic insomnia who need to be treated with drugs, most patients, especially the elderly ones, are treated by physical means, because the possible abuse of insomnia drug may induce other diseases [3, 4]. Therefore, both doctors and patients became gradually concern about and recognize the physical therapy or psychological intervention, such as acupuncture point moxibustion, acupuncture, manipulation, massage and other traditional Chinese medical treatment as well

Table 1. Comparison of general information for 3 groups of the patients before treatment ($\bar{x}\pm s$)

Group	Male/Female (Case)	Height (cm)	Body weight (kg)	Age	Disease course (month)	Illness		
						Mild	Moderate	Severe
Tai Chi Group	13/17	169.37±3.56	67.40±3.12	65.50±3.84	9.37±4.39	13	17	0
Acupoint massage group	14/16	170.24±4.08	68.29±3.55	64.82±3.45	10.02±3.96	14	16	0
Combination group	14/16	169.62±3.55	68.13±2.96	65.16±4.05	9.59±4.40	13	17	0

Note: P > 0.05 in the inter-group comparison.

as psychological counseling, sports and other means, all of which have significant therapeutic effect on patients suffering insomnia. In this study, based on the special physical and mental characteristics of the elderly patients and starting from the relative principles for treatment like physical improvement, meridian regulation and psychological suggestion, the patients received the practical treatment which combines Tai Chi with self-acupoint-massage. It is convenient for the patients to practice it in their daily life. After 3-month practical treatment and 6-month follow-up visit and interview, it was found that the combination group recovered much faster than the mono-therapy group and the recurrence rate of their insomnia was lower.

Object and method

Study objects

Old people with Insomnia people in 7 residential communities in the hi-tech zone of Jiaozuo city were the study objects and 90 of them were selected for purpose of comparison of experimental data. The inclusion criteria were as follows: ① Patients had the relevant symptoms in the clinical diagnostic criteria set out in *China Adult Insomnia Diagnosis and Treatment Guidelines* formulated by Neurology Branch, Chinese Medical Association; ② Patients at once suffered from fatigue and general discomfort; or their attention maintenance ability or their memory was impaired; or their ability to learn, to work and/or to communicate declined; or their mood swung or they were irritable; or they tended to sleep in daytime; they lost their interest and vigor; they suffered from nervousness, headache or dizziness; or they were over-concerned about their sleep; ③ The patients with secondary chronic insomnia whose course of disease was more than 6 months and who did Tai Chi exercise; The exclusion criteria were as follows: ① the patients whose insomnia was induced by other physical diseases or the patients with severe insomnia who must rely on drug treatment; ② patients who suffered from mental illness or limb dysfunction that was not conducive to training treatment of limb functions; ③ patients with primary, acute or sub-acute insomnia, and patients for whom other measures were adopted in the practical treatment period; ④ patients failed to receive treatment as was scheduled and who dropped out due to special diseases in the process of treatment; ⑤ patients who had done or were doing Tai Chi exercise. All patients were informed of and consented to the above information and they were willing to abide by the doctor's advice and the treatment arrangement. The two groups of patients were divided into an observation group and a control group by random number table with each group consisting of 30 patients. General information for 3 groups of patients were compared statistically and the inter-group difference was not obvious, P > *0.05*, and they are comparable. See **Table 1**.

Treatment methods

The patients in Tai Chi group only study the Tai Chi fitness method and practice it. Methods: 24-style Simplified Tai Chi Quan in the general teaching material for Chinese higher education physical education colleges and universities was used by the selected patients for theoretical guidance, technical explanation and action training. Tai Chi professional coaches provided concentrated training for the selected patients for two weeks until the patients were proficient in finishing the complete set of postures guided by the background music and basically master the essentials. Then, they could either independently or collectively practice Tai Chi guided by the background music. Requirements: focus on or attach importance to the surrounding environment and background music quality when practicing Tai Chi. It was necessary to choose beautiful and fresh training environment and clear, quiet and soothing background music so that the patients could feel physically

and mentally well in the process of watching, hearing and feeling, which was more beneficial to their physical and mental conditioning. The patients did such exercise for 45 minutes once every morning and every evening and a total of 3-months practice and treatment was required.

Acupoint massage group was only treated by acupoint massage. Massage methods were as follows: select four acupoints special for treating insomnia, i.e, Baihui, An'mian, Shenmen and Neiguan. When pressing Baihui acupoint, lift both hands and use the finger tip of the middle finger of one hand to press this acupoint and the tip of the middle finger of the other hand to stack on the nail cap of the middle finger that presses directly on Baihui. Two middle fingers stack to massage this acupoint forcibly. When pressing An'mian acupoint, lift both hands and use two thumbs to press An'mian and four fingers of two hands respectively hold the head to support and match thumbs to massage. When pressing Shenmen and Neiguan acupoints, a thumb of one hand presses the acupoint of the other hand and the other 4 fingers press the arm of the acupoint hand so as to match with the thumb. The above four acupoints were pressed by the patients for 1-2 times a day and, after they massaged one acupoint for five minute, they moved on to another acupoint for similar massage. Each acupoint was pressed for 1-2 time for each practice and about 30 minutes' massage was required in total. Massage requirements: in the massage process, it required "pressing" action together with "kneading" action. Generally, after pressing the acupoint for about 1 minute or when ache feeling is strong, slightly reduce the force; additionally, the force shall be proper regardless of pressing or kneading so that the patients could feel enough ache but could bear it anyway. It needs the patients to press and knead the acupoint before sleep each night.

The patients in the combination group did Tai Chi exercise and the acupoint massage every day with the former as the core. The treatment requirements and notes were the same as those for the above two single treatment groups.

Evaluation of curative effect

Emotional detection: Use anxiety detection scale in Exon emotional stability scale to detect the patients before and after 3 months' treatment. The emotional scale includes 30 questions. 1 score was obtained if the question, marked with "+", was answered with a "Yes"; 1 score was obtained if the question, marked with "-", was answered with a "No" and 0.5 score was obtained if the question was answered with "uncertainty". 0 score was obtained if question was answered with "inconformity". The lower the final accumulative score, the more stable the emotion. Their emotion was not stable if they got a score between 30~16, meaning that they are relatively anxiety; while a score between 15~1 scores showed that their emotion was relatively stable.

Life quality assessment: Use the comprehensive life quality assessment questionnaire (GQOLI-74) to assess the life quality of patients in all groups once respectively before treatment and after 4 weeks' treatment. The assessment included 4 aspects: body, psychology, society and material. The first three dimensions had 5 factors respectively and the material function included 4 factors. In addition, there was an overall life quality factor, so, there were 20 factors in total. The higher the score was, the better the overall life quality.

Sleep quality detection: Before treatment and after 90 days' treatment, adopt SPIEGEL sleep scale to detect their sleep quality. The scale includes time to go to bed each night, total sleep time each night, times for waking up; sleep depth, conditions about their dreams, feel after waking-up, which included a total of 6 dimension indexes. 5-score system was adopted for each dimension, respectively 0, 1, 3, 5 and 7. The higher the score was, the more obvious the insomnia symptoms.

Evaluation of clinical curative effect: Evaluate the curative effect by clinical curative effect in combination with reduction rate of SPIEGEL Sleep Scale score. Reduction rate calculation method: scale reduction rate = (the total score before treatment-the total score after treatment)/the total score before treatment × 100%. They were cured if their symptoms completely or basically disappeared and the reduction rate ≥ 80%; the treatment effect was excellent if their symptoms basically disappeared and the reduction rate ≥ 50%; the treatment was effective if their symptoms were improved or partially improved and the reduction rate ≥ 30%; the

Table 2. Comparison of emotional rating scale (s) for 3 groups before and after treatment ($\bar{x}$±s)

Group	Male/Female (Case)	Exon anxiety emotion test (score)	
		Before treatment	After treatment
Tai Chi Group	13/17	23.41±3.86	19.25±3.14[a]
Acupoint massage group	14/16	23.26±3.60	20.17±3.48[a]
Combination group	14/16	23.70±3.79	16.55±3.06[a,b]

Note: comparing inter-group before and after the treatment, [a]P < 0.05; comparing the combination group with other two groups at the same time point after the treatment, [b]P < 0.05.

Table 3. Comparison of patients' life quality score for 3 groups before and after treatment ($\bar{x}$±s)

Group	Male/Female (Case)	GQOLI-74 overall life quality score (Point)	
		Before treatment	After treatment
Tai Chi Group	13/17	60.32±4.23	66.31±4.75[a]
Acupoint massage group	14/16	60.79±4.23	63.05±4.25
Combination group	14/16	60.44±4.31	70.07±4.50[a,b]

Note: comparing inter-group before and after the treatment, [a]P < 0.05; comparing the combination group with other two groups at the same time point after the treatment, [b]P < 0.05.

Table 4. Comparison of patients' sleep quality scale score for 3 groups before and after treatment ($\bar{x}$±s)

Group	Male/femal (Patients)	SPIEGEL sleep quality scale score (Point)	
		Before treatment	After treatment
Tai Chi Group	13/17	21.32±3.51	14.86±2.67[a]
Acupoint massage group	14/16	21.25±3.47	15.40±2.93[a]
Combination group	14/16	21.64±3.40	10.74±1.92[a,b]

Note: comparing inter-group before and after the treatment, [a]P < 0.05; comparing the combination group with other two groups at the same time point after the treatment, [b]P < 0.05.

treatment was ineffective if their symptoms showed no change or were worsened or the reduction rate < 30%.

Recurrence rate comparison: After 3 months' treatment, stop the treatment for 3 groups of patients and follow up and interview them for 6 months. Then observe their recurrence rate. At the sixth month after stopping the treatment, test the sleep quality of the cured patients.

Statistical analysis

Use SPSS 19.0 statistical software to summarize and process data. The obtained data was expressed by ($\bar{x}$±s). Then, compare the internal group data respectively before and after the treatment and conduct inter-group comparison of the measurement data. Comparision among all the groups was analyzed by variance. If the total difference showed statistical significance, then use Dunnett-t test to conduct pairwise comparison. Meanwhile, use χ^2 test to compare the count data; if P < 0.05, the difference had the statistical significance.

Results

It could be known from data in **Tables 2-4** that Exon emotional stability scale, GQOLI-74 overall life quality scale and SPIEGEL sleep quality scale were used to respectively detect and compare three groups of patients before treatment and after 30 days' treatment. It was found that, except that GQOLI-74 overall life quality score of the acupoint massage group was not obviously improved, the detection indexes for 3 groups of patients and other scale scores were obviously improved than before the treatment, [a]P < 0.05; compared with other groups at the same time point after 30 days' treatment, the improvement effect of the combination group was better, [b]P < 0.05. The difference between improvement effects showed the statistical significance. It could be known from **Table 5** that upon evaluation of the clinical curative effect, 8 patients in Tai Chi Group are cured and the cure rate was 26.67%; while treatment of 5 patients was ineffective, so, the total rate of effectiveness was 83.33%; 6 patients in acupoint massage group were cured and the cure rate was 20.00%; while the treatment of 7 patients was ineffective, so, the total rate of effectiveness was 76.67%; 13 patients in the combination group were cured and the cure rate was 43.33%; while the treat-

Table 5. Comparison of patients' clinical curative effect for 3 groups after treatment ($\bar{x}\pm s$)

Group	Male/Female (Patients)	Clinical curative effect (Patients, %)				
		Cure	Excellence	Effective	Invalid	Overall efficiency
Tai Chi Group	13/17	8, 26.67	9, 30.00	8, 26.67	5, 16.67	25, 83.33
Acupoint massage group	14/16	6, 20.00	7, 23.33	10, 33.33	7, 23.33	23, 76.67
Combination group	14/16	13, 43.33	8, 26.67	8, 26.67	1, 3.33	29, 96.67*

Note: comparing the total efficiency of the combination group with other two groups, *$P < 0.05$.

Table 6. Comparison of patients' cure rate and reoccurrence rate for 3 groups after treatment ($\bar{x}\pm s$)

Group	Male/Female (Patients)	Cure rate after 3 months		Reoccurrence rate within 6 months after cure	
		Cure (Patients)	Reoccurrence rate (%)	Reoccurrence (Patients)	Reoccurrence rate (%)
Tai Chi Group	13/17	8	26.67	3	37.50
Acupoint massage group	14/16	6	20.00	2	33.33
Combination group	14/16	13	43.33[a]	2	23.08[b]

Note: comparing the cure rate of the combination group with other two groups, [a]$P < 0.01$; comparing the reoccurrence rate of other two groups, [b]$P < 0.05$.

ment of 1 patient was ineffective, so, the total rate of effectiveness was 96.67%. In case of Comparison of clinical curative rate and total rate of effectiveness between the combination group and other groups, $P < 0.01$ or $P < 0.05$; the clinical cure rate and total rate of effectiveness of the combination group were significantly higher than those in other groups. It could be seen from **Table 6** that, after 6 months' follow-up and interview, the clinical recurrence rate of the combination group was significantly lower than that of the other groups, $P < 0.05$.

Discussion

Insomnia is a common and prevalent disease among old people. The relevant research reports point out that the main cause of old people's insomnia is related to their physical characteristics and psychological factors, and that the physical characteristics factor is also pathogenic physiological factor, which is related to decline of their tissues, organs and body function. For example, deficiency of five internal organs is closely related to insomnia, among which the kidney deficiency is the main physiological causes [5, 6]; When people become old, they may not be confident about their health due to household chores and decline of their physical functions, which often induces the anxiety and rage and damages heart and spleen, meanwhile, they may suffer from insufficient nutrition and blood and absent-mindedness. At last, they have to face insomnia [7]. It can be seen that the physiological pathological factor is the basis for insomnia of the old people, while the psychological factor is the inducement. In the traditional Chinese medicine, it is believed that old people should supplement deficiency, improve body function, strengthen psychological guidance and adjust the mental state so as to regulate and improve their physiological and psychological functions [8, 9].

It is well known that physical exercise is an effective means to enhance human tissues and organ functions and improve the health status, spirit and essence of human body. Tai Chi is a beautiful flower in the garden of Chinese Traditional Wushu and it is deeply rooted in traditional Chinese philosophy, health science, Chinese traditional health science, exercise science, China traditional medicine, aesthetics and other disciplines. Its fitness effect has been generally accepted in the world. The exercise focuses on harmony between man and nature as well as internal and external refining. It is characterized by meridian dredging, essence improvement and slow motion, so, it is an exercise suitable for physical and mental characteristics of the old people [10]. Related research report points out that Tai Chi is proud of its unique harmony between internal and

external body, dynamic and static combination, natural breathing and integration of posture and spirit. If the people can practice it after the intense work, they will feel refreshed and energetic. In case of long-term exercise, it will play a special role in relieving the tensioning emotion and promoting physical and mental health [11, 12]. Chang MY et al. [13] also suggests upon studies that Tai Chi exercise can significantly improve psychological and autonomic nervous function of the old people; the other reports also indicate that Tai Chi is a sport that can improve both the physical and the mental state. In the process of practice, it can give whole care to both body and mind and focus on static and dynamic combination, which is not only conducive to the health, but also suitable for physical and mental conditioning. The static and dynamic exercise can regulate spirit, essence and breathing, consequently it can tranquilize the mind, coordinate organs, harmonize Qi and blood and dredge the human blood [14, 15]. Therefore, Tai Chi has become a favorite fitness exercise program of the old people. Irwin MR et al. [16] respectively treated 30 insomnia patients by Tai Chi and it was found that the intervention effect was obvious after 8 weeks' intervention. In this study, 30 elderly insomnia patients in Tai Chi group were regarded as the experimental objects. After 3 months' mere Tai Chi exercise, patients' sleep quality, emotion and life quality scale score were significantly improved in comparison with those before treatment, $^{a}P < 0.05$; upon the clinic curative evaluation, the cure rate was 26.67% among 30 patients and the total rate of effectiveness was 83.33%; the recurrence rate of the cured patients was 37.5% within 6 months after the cessation of treatment.

According to the Chinese medicine acupuncture treatment principle, Baihui acupoint is an intersection of meridians and acupoints (Three-Yang and Five-Yin) in the human body and this acupoint can refresh the mind and recover Yang Qi and it can regulate the deficiency of Qi and blood and strong liver-fire and other diseases [17]; Anmian acupoint is an extra-channel acupoint and a practical acupoint in treating insomnia in Chinese medicine. It is used to treat neurasthenia, hysteria and psychosis in modern medicine [18]; Shenmen acupoint is one of the heart meridian acupoints and relates to the essence and spirit of human body. Pressing this acupoint can regulate Qi and blood essence within the heart meridian, thus it is beneficial to treat heart disease, vexation, palpitation, forgetfulness, insomnia and other diseases [19]; Neiguan acupoint is a common acupoint of pericardium meridian. Pericardium meridian can bar pathogenic factor when it attacks the heart. Pressing this acupoint can regulate the heart function, which is beneficial to the body and the mind [20]. In addition, patients can conduct self psychological suggestion or psychological adjustment in the process of self acupoint massage, which can calm down the body and the mind and avoid occurrence of anxiety. In this study, 30 elderly insomnia patients in the acupoint massage group were regarded as the experimental objects and the above 4 acupoints were selected as the massage treatment acupoints. After 3 months' mere massage treatment, patients' life quality scale score was not obviously improved in comparison with that before treatment, $P > 0.05$; however, their sleep quality and emotion scale score were significantly improved in comparison with those before treatment, $^{a}P < 0.05$; upon the clinic curative effect evaluation, it was found that the cure rate is 20.00% among 30 patients and the total rate of effectiveness was 76.67%; the recurrence rate of the cured patients was 33.33% within 6 months after the cessation of treatment.

Based on the effect of the above Tai Chi exercise and acupoint massage on the improvement of the physical and mental state of the old people and on the regulation of their Qi and blood, 30 patients in the combination group were regarded as the experimental objects in this study and 30 patients in Tai Chi group accepted the acupoint massage as the auxiliary treatment and they were provided with the combination treatment. After 3 months' combination treatment, all test indexes were significantly improved in comparison with those before treatment, $^{a}P < 0.05$ or $^{b}P < 0.05$ and its clinic curative effect was more significant in comparison with that of other single treatment group. The cure rate was 43.33% among 30 patients and the total rate of effectiveness was 96.67%; comparing the recurrence rate with other groups receiving single treatment, $^{a}P < 0.01$; comparing the total rate of effectiveness of other groups receiving single treatment, $^{b}P < 0.05$; the recurrence rate of the

cured patient was 23.08% within 6 months after the cessation of treatment. Comparing the recurrence rate other groups receiving single treatment, $^{*}P < 0.05$ and the recurrence rate was relatively low.

In summary, the results suggest that, 3 months' mere Tai Chi exercise or acupuncture massage can really improve the negative symptoms of elderly patients suffering insomnia. In addition to Tai Chi exercise, the patients practiced acupoint massage for once or twice a day as an auxiliary treatment. In this way, it could significantly improve the the effect of mere Tai Chi exercise treatment and the recurrence rate was relatively low in comparison with groups receiving single treatment. The combination therapy was simple and easy to operate and beneficial to the fitness of old people, essence and spirit. It can be used by the old people as self-exercise or health care means in their daily leisure time, so, it is worthy of clinical application and promotion among the old patients.

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Disclosure of conflict of interest

None.

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