



Applications of Art Therapy in the Treatment of Alzheimer's Disease

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Abstract. With the rapid aging of the population, the incidence of Alzheimer's disease is increasing year by year, and the side effects of drug treatment cannot be underestimated. This article focuses on the therapeutic effect of art therapy on Alzheimer's disease. Art therapy mainly uses artistic media as a means of expression and communication, improving patients' learning and memory functions. Common art therapies can be divided into painting therapy, music therapy, and dance therapy. This study screened 200 patients and divided them into an art therapy experimental group (50 cases), a music therapy experimental group (50 cases), a dance therapy experimental group (50 cases), and a control group (50 cases) using a random number table method. After 16 weeks of treatment, the effective rate of the music therapy experimental group was 94.0%; The effective rate of the painting therapy experimental group was 92.0%; The effective rate of the dance therapy experimental group was 84.0%; The effective rate of the control group was only 66.0%. Art therapy can significantly improve the effectiveness of Alzheimer's disease treatment and can be promoted and applied in clinical practice.

Keywords: Art therapy, Alzheimer's disease, painting therapy, music therapy, dance therapy

1 Introduction

The National Health Commission of China held a press conference on September 20 in 2022, stating that Alzheimer's disease (AD) is the most common type of dementia in the elderly. There are approximately 15 million dementia patients among the elderly aged 60 and above in China, of which 10 million are Alzheimer's disease patients. This disease has had a significant impact on the health and quality of life of the elderly. The country attaches great importance to the construction of the prevention and control system for dementia in the elderly. The Elderly Health Promotion Action of The Healthy China Action for has set "the incidence rate decline of dementia in the elderly among people aged 65 and above" as one of the outcome indicators.

Alzheimer's disease is a chronic progressive neurodegenerative disease that often occurs in middle age or early adulthood, with slow progression of dementia as the

main manifestation [1]. The onset of the disease is hidden and irreversible, with high incidence rate, high disability rate and heavy social and economic burden. Most patients died of its complications. The loss of independent living ability by patients creates a huge economic burden on family members, nursing staff, and the entire society, which has a negative impact on personal life and social development. At present, the pathogenesis of AD is not yet clear, but it has been confirmed that its occurrence and development are related to β - Amyloid protein ($A\beta$) Deposition and abnormal phosphorylation of tau proteins are closely related. The main pathological feature of AD is the presence of A in the brain β Deposition, formation of neurofibrillary tangles, and loss of synapses and neurons. The clinical manifestations include cognitive decline and circadian rhythm disorders, a decrease in daily life self-care ability, and slow impairment of memory and cognitive function as the disease progresses, ultimately affecting the patient's quality of life.

At present, the treatment methods for Alzheimer's disease are mainly divided into drug therapy and non-drug therapy [2]. Although drug therapy has been proven to improve patients' learning and memory functions, its side effects should not be underestimated. For example, tacrine has hepatotoxicity, donepezil can cause bradycardia; lisantine has inhibitory effects on central nervous system AchE. Galantamine has highly selective and inhibitory effects on AchE in neurons. In addition, these drugs available on the market have high costs and can only temporarily alleviate the symptoms of dementia in AD to a certain extent, which cannot effectively prevent disease progression. This article will focus on the art therapy in non-drug therapy, explore its application methods and practical effects, and provide reference for the treatment of Alzheimer's disease.

2 Overview of Art Therapy

Art therapy originated in the 1940s in Britain. The British Association of Art Therapists defines art therapy as a form of psychotherapy that primarily expresses and communicates through the medium of art, aimed at solving confusing and painful emotional problems. The American Art Therapy Association defines it as a therapy which engages patients in a nonverbal way to improve their cognitive and sensory functions, cultivate self-esteem, enhance self-awareness, enhance emotional resilience and social skills, and reduce conflicts and pain under the guidance of professional art therapists [3]. At present, the concept of art therapy has not been unified. The focus of the British and American Art Therapists Association on concepts varies. The British Art Therapists Association focuses on art as a medium of expression and communication, while the American Art Therapists Association describes a concept that leans more towards the role of art therapy and provides a detailed explanation of its role.

At present, the theoretical foundations of art therapy mainly include left and right brain division theory, psychological projection theory, and cardiac flow theory. The theory of division of labour between the left and right brain indicates that the right brain dominates emotional thinking such as music, painting, imagination, and

emotions. Psychological projection refers to the reflection of different latent consciousness, which is an unconscious and involuntary manifestation activity. The flow theory emphasizes that learning and memory depend on the ability of the cerebral cortex to retain, providing a carrier for emotional expression. The flow theory well explains how art therapy improves cognition, negative emotions, and happiness in dementia patients, and is more specific to dementia patients. In the theoretical research on how art therapy works, Chancellor et al. proposed a theoretical framework for art therapy that includes three parts: retention, carrier, and flow, and has been widely applied. Firstly, art therapy relies on retained abilities rather than attempting to correct disabilities. Dementia patients relatively retain the early visual cortex that supports low and moderate vision, and they are able to recognize contours, colours, positions, separation, and grouping components [4]. Dementia patients can also rely on well preserved sensory cortex, motor cortex, and procedural memory to learn new sensory, motor, and artistic skills. Secondly, art therapy provides a carrier for emotional expression for dementia patients with language communication difficulties. Dementia patients may have strong emotions, but they cannot express them through appropriate language, and even in the middle and late stages, most patients still do not have special facial expressions. Art therapy provides dementia patients with the opportunity to express their emotions through nonverbal forms such as lines and colours. Finally, art therapy can generate a state of flow related to happiness, which is called flow. Heart flow is achieved by setting clear and within the scope of one's abilities. Art therapy is goal oriented and an activity with immediate feedback characteristics that can trigger cardiac flow [5].

3 Three Types of Art Therapy For Treating Alzheimer's Disease

There are three types of art therapy commonly used to treat Alzheimer's disease, namely painting therapy, music therapy, and dance therapy. The simultaneous use of two therapies and three therapies is often used in the actual treatment process.

3.1 Painting Therapy

Painting therapy refers to the systematic professional process of using painting media or materials, creative art activities, and the resulting art works to present individual emotions, help individuals reconcile emotional conflicts, cultivate self-awareness, improve social skills and management behaviour, alleviate anxiety, and improve self-esteem. Painting therapy uses painting, colouring, paper cuttings, collage and other art activities to intervene the elderly [6]. Through visual search, location recognition and other techniques, it directly stimulates the cognitive function of the brain to fully express emotions and vent bad emotions, so as to improve social skills, promote cognitive, activity and other aspects of exercise, and improve the quality-of-life activities. The application of painting therapy in the field of cognitive impairment began in the 1980s and is mainly used to help observe patients' conditions. Research

has found that the works of dementia patients have characteristics such as pattern repetition, fragmentation, fragmentation, pinching, chaotic perspective, fragmented lines, and blurred details. This discovery provides a basis for caregivers to evaluate disease progression and outcomes. With the further development of painting therapy, its intervention effect has gradually been confirmed. In the 21st century, painting therapy has gradually increased its use in cognitive function interventions, and its research objects have gradually expanded to the field of mild cognitive impairment. Painting therapy based on cognitive training strategies has emerged. This therapy not only focuses on the emotional expression of participants, but also aims to restore cognitive function, mainly including episodic memory, inductive reasoning, visual search, and location recognition [7]. In addition, the forms of intervention have gradually diversified, not only limited to traditional art forms such as painting, collages, and shape cutting, but also emerging new intervention methods such as visual art activity centred around appreciating classic art works in museums and galleries. The form of combining art with museum attributes and educational practices has shown certain development potential in promoting interaction between caregivers and participants [8].

3.2 Music Therapy

Music therapy, as a type of auditory art therapy, can be used for the treatment of dementia patients at any stage, even in the late stages of disease development and severe cognitive decline [9]. Music therapy can also improve negative emotions such as anxiety in dementia patients. The music therapy for Alzheimer's disease can mainly improve brain cell excitability and neuroendocrine function through music stimulation, in order to achieve the therapeutic effect of improving brain function. In clinical practice, different types of music have certain differences in regulating brain cells. Light music can alleviate irritable emotions, while excited music can enhance brain nerve excitability and reduce apathy. Music therapy for Alzheimer's disease is not a specific treatment for this disease, but only an adjuvant treatment. The individual differences in treatment effectiveness are significant, with some patients showing no significant improvement, while others showing strong improvement effects. Music therapy is an interdisciplinary field that combines music, medicine, education, and psychology. It has demonstrated certain value in treating or alleviating depression, sleep disorders, post stroke rehabilitation, postoperative pain, and other aspects. Some foreign studies have shown that after using music therapy twice a week for a period of time, patients' language function significantly improves, mainly reflected in the fluency of language expression and the richness of narrative content. Music therapy is divided into receptive music therapy and interactive music therapy. Research has shown that receiving music therapy can reduce anxiety and behavioural problems in elderly dementia patients, and is more effective than interactive music therapy. Auditory art therapy can reduce negative emotions such as agitation and depression in dementia patients, and has a positive effect on severe dementia patients. Compared to interactive music therapy, the implementation of receptive music

therapy is simpler and more convenient. Therefore, we recommend using receptive music therapy in nursing homes, day care centres, and patient homes [10].

3.3 Dance Therapy

The psychological basis of dance therapy comes from Jung's concepts of analytical psychology, gestalt psychology, and self-psychology [11]. There is a natural flow of energy within all living organisms. Psychological conflicts can affect this natural flow, causing chaotic currents. The external manifestation of this chaotic flow is maladaptive movement, posture, and breathing movements. Through dance as a form of exercise, not only can people's maladaptive movements, postures, and breathing be corrected, but also hidden emotions such as anxiety, anger, sadness, and depression can be safely released, making people feel their control over personal existence. Therefore, dance therapy can be an important means of promoting physical and mental health. A new study published in the recently published Swiss journal *Frontiers of Human Neuroscience* shows that if elderly people regularly participate in physical exercise, they can reverse the aging signals in the brain, with dancing having the most significant effect. Exercise has the effect of alleviating, or even reversing, the mental and physical degradation caused by aging. This study found that both different exercise methods can alleviate the signs of aging in the brain area. In contrast, only dancing can bring significant behavioural changes in improving balance. In this study, researchers recruited elderly volunteers with an average age of sixty-eight who underwent dance or endurance and flexibility training once a week for eighteen months. The results showed that both groups of elderly people had significantly enhanced functions in the hippocampus region of the brain compared to their peers [12]. Researchers say that traditional sports typically involve repetitive activities such as cycling or walking, but dancing is different. This poses a certain challenge for the elderly and is in a state of continuous learning.

4 Effect of Art Therapy on Alzheimer's Disease

4.1 Experimental Subjects and Methods

200 Alzheimer's disease patients admitted to a certain hospital from June 2020 to June 2023 were selected as the research subjects. They were divided into an art therapy experimental group (50 cases), a music therapy experimental group (50 cases), a dance therapy experimental group (50 cases), and a control group (50 cases) using a lottery grouping method. The comparison of general data such as gender, age, education level, and MMSE scores among the five groups showed no statistically significant differences ($P>0.05$), as shown in Table 1, indicating comparability.

Table 1. Comparison of general information (table credit: original)

Group	Number	Average age	Average length of education	MMSE score
Group of Painting Therapy	50	68.523±3.521	6.257±1.854	13.101±3.585
Group of Music Therapy	50	70.214±3.171	6.249±0.968	14.214±2.661
Group of Dance Therapy	50	69.178±2.198	6.624±1.444	13.321±2.995
Control group	50	69.587±2.987	6.753±2.105	13.887±2.304

This study was approved by the medical ethics committee of the hospital, and all participants had informed consent. All patients meet the diagnostic criteria for Alzheimer's disease. Inclusion criteria: Conforming to the diagnostic criteria for Alzheimer's disease published by the American Psychiatric Association's Diagnostic Statistics Volume 4, diagnosed with Alzheimer's disease through CT; MMSE score 10-25 points; Patient memory impairment, especially recent memory; The patient or family member signs an informed consent form; Moderate dementia; Accompanying at least one behavioural and psychological symptom. Exclusion criteria: Patients with severe aphasia and cognitive impairment who are unable to communicate; Patients with severe heart, kidney, liver, and lung dysfunction, failure, or cancer; The course of the disease is less than 5 months; Individuals with early cognitive impairment; Psychological problems caused by other reasons.

The painting experimental group received painting therapy and oral administration of memantine twice a day, 10mg per dose. The control group was given oral administration of memantine twice a day, 10mg per dose, for a course of 16 weeks. This research adopts group intervention, including painting, colouring, jigsaw puzzle, collage, paper cuttings, clay sculpture, etc. Choose a painting intervention form based on the theme of nostalgia in the activity. At the beginning of the activity, greet each other, and then guide the elderly to reminisce and experience their lives by displaying old photos, nostalgic items, etc. Painting creation begins. After the completion of the work, paintings are encouraged to narrate the painting and express the emotions contained in the work and their own feelings during the creation process.

The music experimental group was given music therapy and oral administration of memantine twice a day, 10mg per dose. The control group was given oral administration of memantine twice a day, 10mg per dose, for a course of 16 weeks. According to the patient's cultural background and selection of music types, listening to music requires a quiet and tidy environment. The patient can freely adopt comfortable postures and clap their hands, fingers, legs, and other movements according to the music rhythm to move their limbs and relax their body and mind.

The dance experimental group was given dance therapy and oral administration of meglumine twice a day, 10mg per dose. The control group was given oral administration of memantine twice a day, 10mg per dose, for a course of 16 weeks.

The experimental group received 35-minute aerobic dance intervention three times a week, including the following three stages. Stage 1: 5-minute warm-up, including standing still, breathing, head movements, side turns, and turning exercises; Stage 2: 25-minute target heart rate dance; Stage 3: 5-minute recovery, including slow shoulder movements, stepping, and breathing exercises.

The control group was given oral administration of memantine twice a day, 10mg per dose, for a course of 16 weeks. The control group received daily care from the hospital, including personal cleaning, daily living, and environmental hygiene services.

4.2 Experimental Results and Analysis

In terms of efficacy evaluation, the focus is on the indicator of memory. Establish a self-made daily cognitive registration card at the time of patient admission, conduct weekly assessments, and summarize monthly. A questionnaire survey was conducted before discharge to assess the satisfaction of patients and their families with nursing staff. The higher the score, the higher the job satisfaction. The recovery of Alzheimer's disease was indirectly evaluated. In this survey, 200 questionnaires were distributed and 200 were collected, with a recovery rate of 100%. This article was conducted using SPSS 17.0 software, and the counting data was expressed in terms of rate. The comparison of the counting data was conducted using chi square test, with $P<0.05$ indicating a statistically significant difference. The clinical efficacy comparison of the four groups of patients is shown in Table 2.

Table 2. Comparison of clinical efficacy among patients (table credit: original)

Group	Number	Excellence	Improvement	Failure	Total effective rate
Group of Painting Therapy	50	20	26	4	92.0%
Group of Music Therapy	50	24	23	3	94.0%
Group of Dance Therapy	50	19	23	8	84.0%
Control group	50	14	19	17	66.0%

The results of this study show that the effect of music therapy group is better than that of painting therapy group; The effect of the painting therapy group was better than that of the dance therapy group. No matter which art therapy is used, the treatment effect of Alzheimer's disease is much higher than that of the control group (only using medication treatment group), and the difference is statistically significant ($P<0.05$). Art therapy can improve the mental and psychological problems of Alzheimer's patients, improve emotions, and eliminate delusions and hallucinations. The innovative music therapy used in this study aims to address the dementia

behaviour and psychological symptoms of Alzheimer's patients. Art therapy is not limited by venue and can be widely promoted and applied in clinical practice.

5 Conclusions

After the onset of Alzheimer's disease, the patient's advanced neurological functions such as memory, thinking, language, orientation, calculation, understanding, cognitive function, and judgment synthesis are disrupted, leading to a complete inability to take care of themselves in daily life and an increased dependence on the control caregiver. By summarizing and studying the implementation of systematic artistic nursing interventions in 200 Alzheimer's disease patients, it was found that their language, memory, and expression abilities were significantly improved. The effectiveness rate of the music therapy experimental group is higher than that of the art therapy experimental group; The effectiveness rate of the art therapy experimental group is higher than that of the dance therapy experimental group. The effective rates of the three art therapies were higher than those of the control group. Encourage the use of art therapy in the rehabilitation care of Alzheimer's disease patients and contribute to improving their quality of life.

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