

# Research on the Design of Old-age Care Community Planning based on Horticultural Therapy

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**Abstract.** Since the 20th century, with the rapid development of urban construction in China, people's livelihood issues have emerged in the society, among which the environmental construction of old-age care communities has become one of the key issues concerned by the government. Horticulture therapy can create a livable material environment for the elderly by utilizing the convalescent effect of natural plant landscape, improve the living conditions of the elderly, and relieve the economic pressure brought by the aging society. In this paper, the development status of horticultural therapy at home and abroad is reviewed, and the unique effect characteristics of horticultural therapy theory are analyzed from the perspective of theoretical basis. Then, by combining the design principles of horticulture therapy with the problems encountered by the elderly in the living environment of the community, the paper finally puts forward the basic strategies of environmental planning of the community for the elderly, hoping that horticulture therapy can be used as a treatment approach to enter the community for the elderly and provide an innovative convalescent environment for the elderly.

**Keywords:** Elderly community; Health; Horticultural therapy.

## 1. Research Status of Horticultural Therapy at Home and Abroad

### 1.1 Introduction to Horticultural Therapy

The concept of horticultural therapy first appeared in Japan in 1982. The American Horticultural Association's definition of horticultural therapy is the use of plants and horticulture-related activities to regulate people's psychological and physiological conditions in society, thereby improving people's physical conditions and Mental state. The narrow angle of horticultural therapy mainly contributes to medical treatment. As a non-invasive treatment method, it can help people heal and recover. Horticultural therapy in a broad perspective combines the research of plants, gardens, medicine, and psychology. The system of horticultural therapy has the characteristics of both physical therapy and psychological therapy, and this system does not exist independently. Horticultural therapy needs to integrate a variety of treatments, such as biotherapies that stimulate the human senses with plant combinations, Aroma Therapy, Flower Therapy, which is used to transform the space environment to soothe the mind and body, and Phytotherapy based on traditional Chinese medicine, which can pass through living bones. Horticultural therapy can bring various benefits to the social environment by studying the interaction between natural plants and human society.

### 1.2 Research Progress at Home and Abroad

With the rapid development of cities, many developed countries in Europe have entered the aging society as early as the 19th century. In the 1970s, scholars and entrepreneurs engaged in horticultural therapy recognized the positive effects of yard therapy, so they established relative societies and organizations. Horticultural therapy began to be widely used as a form of recreation and treatment in hospitals, nursing homes and community square gardens in Europe. After the 1980s, experts and scholars who studied gardening, psychology and sociology put forward more theories of horticultural therapy. As a pioneer of rehabilitation landscape, Ulrich successively proposed the theory of health generation and the theory of stress alleviation. From the perspective of landscape gardening, Ulrich proposed the principle framework of horticultural therapy design, and emphasized the importance of investigation and experiment in the process of recuperation design. Cooper Marcus (1999) continued the thinking of Ulrich and discussed the preliminary

research, design thinking, construction and later evaluation of American recuperative gardens, so as to combine the design method of horticulture therapy with the physical feeling, behavior pattern and spiritual needs of the surveyed population, which laid a solid foundation for the development of horticultural therapy theory. In the 1990s, after the survey report on the current situation of horticultural therapy published by Japan green center in 1991, the research focus of horticultural therapy in developed countries led by Japan changed from collating academic theories to analyzing the application of horticultural therapy and evaluating relevant practical cases. For the construction project implementation such as: Elizabeth and nona Evans rehabilitation, providence farm and garden guelph rehabilitation garden experience summarized, such development of gardening therapy health care, nursing, repair, and other functions constantly promoted horticultural therapy use in the community environment.

The exploration of horticultural therapy in China originated from the design and research of Chinese classical gardens and courtyards. In the early 20th century, scholars from famous universities and experts in related fields began to sort out the materials of foreign rehabilitation landscape and published papers or books. Professor Yongji Liang of China forestry university published in 2002 "hospital sanatorium garden green space design" introduced the green space design in horticultural therapy landscape. Yuren Guo, Professor of National Taipei University of nursing and health, sorted out the basic concepts of landscape therapy, reviewed the historical development process, discussed the implementation strategies, and analyzed relevant cases in the treatment landscape and horticultural therapy in 2005. In 2011, Shuhua Li, a professor from Tsinghua university, published his first book on horticulture therapy called "introduction to horticulture therapy", which analyzed the development status, functional characteristics and application cases of horticulture therapy in details. This is the first work to be used as the teaching material of horticulture major in colleges and universities, which laid the theoretical foundation of horticulture therapy in China. From the perspective of the elderly, Yi Yang's book "a brief analysis of the modern elderly community" explored the positive effects of community environment design on the elderly's communication activities and physical fitness, and gradually introduced the design ideas of horticulture therapy into the elderly community.

In conclusion, developed countries, especially the United Kingdom, the United States and Japan, have abundant experience in both theory and practice in designing horticultural therapy for convalescent communities. There is a certain theoretical basis for the study of horticultural therapy in China, but a complete theory and practical system of horticultural therapy have not been formed in the design. The landscape planning and design for the elderly spa is in the preliminary stage of exploration, the horticulture therapy facilities of many elderly care communities still need to be improved, and there is a great progress compared with the development of horticulture therapy in foreign countries.

## **2. Principles of Horticultural Therapy Design**

### **2.1 Natural**

In the history of human development, in order to survive, human beings have been learning from nature, tracing the origin, and understanding the nature can awaken human nature, so as to make people understand the true meaning of life. From the perspective of social development, a beautiful symbiotic environment can bring people a sense of security and happiness. Through contact with a series of activities related to nature, in the process of returning, the elderly group constantly experience life, purify their minds, broaden their vision and improve their cognitive state, and finally generate a strong sense of spiritual belonging and identity. From the perspective of ecological development, the construction of pro-natural convalescent environment has formed a large pattern of coordinated development of human, society and nature, which not only reduces the damage of human to the climate and soil and other ecological environment in the process of industrialization, but also lays a certain foundation for the realization of sustainable development of human in the future.

## **2.2 Feedback**

Feedback refers to a reaction mechanism that constantly completes the communication and interaction, establishes the communication and interaction mechanism between the elderly's thinking cognition and gardening practice activities, and uses a variety of senses and body movements as the communication media to strengthen their connection with the outside world. In the community pension environment, the interaction between people and plants in the landscape guide people to participate in various gardening activities, experience rich physical and mental experience, obtain a sense of achievement and realize personal value. In the process of participating in the interaction, people's participation status and mind gradually changes from passive to active. Eventually this feedback loop will continue to have a positive effect, making elder people more willing to participate.

## **2.3 Versatility**

Horticultural treatments are varied, such as horticultural therapy that provides physical training, food therapy that regulates bodily functions, flower therapy and aromatherapy that can be seen or smelled. Because of the wide range of disciplines and the variety of treatment methods, horticulture therapy has a strong functional diversity and can serve a variety of people, especially the elderly. It is the focus of horticultural therapy in the elderly community to create diversified garden resorts for the elderly with different needs. For example, a garden is designed for patients with mental illness such as depression and helmez's disease to communicate privately, and it is also a training and repair area for patients with physical diseases such as Parkinson's disease and muscle weakness. Using local geographical conditions and cultural conditions, the environment is designed and planed in many ways, so that the elderly can adjust their body functions in the rich activities, forget their worries, relieve their pressure, and make life no longer boring.

# **3. Horticultural Therapy in the Elderly Community**

## **3.1 The Feasibility of Horticultural Therapy in the Elderly Community Environment Reconstruction**

In recent years, the proportion of the elderly in China has been increasing, and now it has become the focus of attention. According to the statistics of the national office on aging, it is expected that by 2020, the number of people aged over 60 will increase to about 255 million, accounting for about 17.8% of the total population. The figure of oldest will increase to about 29 million, the number of people living alone or empty-nesters will increase to about 118 million, and the dependency ratio for the elderly will increase to about 28 percent. In order to improve the infrastructure construction and the social security system, the community pension service has begun to be concerned by the government, social enterprises, medical groups and other people. In 2013, the law on the protection of the rights and interests of the elderly proposed the requirement of "creating a more comfortable living environment in the elderly community". Li Fengyan talked about two aspects of pension in the context of population aging: firstly, due to the influence of family planning policy, the economic and spiritual burden of family pension to the young generation has become larger, so family pension has been unable to provide a healthy and comfortable living environment for the elderly. Secondly, the imperfection of the environment and medical facilities has greatly restricted the activities of the elderly, making their expectations of a better life unsatisfactory. Horticultural therapy, as a non-invasive treatment method is invested in the community environment. It could improve the environment atmosphere with various natural methods in order to construct a convalescent environment of ecological landscape for the elderly.

### **3.2 Analysis of Physiological and Psychological Characteristics of the Elderly in Community Environment**

Through questionnaire survey and empirical analysis, it is found that the behavior pattern of the elderly has a certain regularity, which is closely related to physiological and psychological changes. In terms of physiological changes in the elderly, due to the slowing down of the body's metabolism, the flexibility of the elderly becomes worse. The scope of activities is mainly in the community green space, near the supermarket stores. The behavior preference of the old includes three kinds roughly: fitness exercise, interest and hobby, social practice. With the growth of age, the elderly have fewer kinds of activities and more limited activity areas, so they have high requirements on the environmental quality within the nursing community. For example, many older people dislike noise and tend to repeat daily activities in quiet, comfortable areas. The decline of body organs leads to the decline of all kinds of sensory abilities of the elderly, which can be manifested as unclear color recognition, impaired hearing and poor sense of smell. The weakening of the five senses in daily life will have a negative impact on the elderly's ability of understanding and expression. Therefore, in the community, the elderly tend to pursue spatial experience that can enhance their perception.

At the psychological level of community communication activities, the transformation of social status makes the elderly prone to a strong mental gap in the spirit, resulting in the elderly have a sense of pessimistic, lonely, low self-esteem and other negative emotions. They lack the care from their families and society, and the greetings from like-minded friends. They are in a state of confusion and emptiness for a long time, and their social skills become worse. However, the current construction of retirement community does not provide the activity space that can satisfy this interactive experience. The elderly can not find the meaning of personal survival from community activities, and can not fit with the surrounding environment, which is not conducive to the recovery and maintenance of social adaptability.

### **3.3 Design Strategies of Horticultural Therapy in Old-age Care Community**

Firstly, establish multi-level spatial sequence to create a comfortable and livable community environment.

In the space design of the elderly community, horticultural therapy can make use of the plasticity of plants to divide the multi-level space sequence, so as to reasonably configure the space scene suitable for the elderly activities. Among them, the forms of this spatial sequence include open, semi-open (transition space) and private space. Different forms of space permeate each other to achieve the harmony and unity between the whole and parts. The open space provides a wide space for the elderly to meet their physical needs. Low plants and garden pieces in the open space will not interfere with the elderly's activities, but also play a role in beautifying the environment and improving air quality. The semi-open and private spaces are interspersed in the large-scale open space, and the plants such as woods, jungles, shrubs and flowers are used to create the changes of the space, forming the multi-layered landscape nodes in the large space. The use of flexible plant modeling to create interesting transition space, such as the arrangement of rattan deciduous plants in the open and semi-open space between the transition, stimulate the curiosity of the elderly. In the green walkway, the site is surrounded by big trees, creating an immersive space for the elderly to have a sense of belonging. The space combination of different temperament not only provides opportunities for the elderly to participate in activities, but also satisfies the elderly's demand for individual independent space to some extent. The diversified spatial scale will give the elderly a sense of novelty, thus attracting more elderly people to participate in rehabilitation activities.

Secondly, establish a multifarious plant perception system to provide the elderly community with horticultural rehabilitation experience.

Horticultural therapy combined with the natural plant color, texture, smell of research, including the impact on the local conditions, such as air, soil, water and light. The introduction of horticultural therapy in the elderly community and the planning of sensory stimulation treatments can arouse the awareness of the elderly, and stimulate the sensory perception of the elderly. The psychological state of the elderly is conducive to mediation. Plant perception pathways include the following:

Visually, the color of plants will have different effects on people's mood. The introduction of different styles and colors of shrubs and trees in the environment by horticultural therapy will produce different visual effects. For example, dark plants produce feelings of calm and peace, relaxing and calming the mood. On the sense of smell, branch and leaves can make the oxygen and water in the air more sufficient. Some partial balmy kind plant is inhaled by the old person, it not only refreshed people, but also relieved mental pressure, and reduced the incidence of cardiovascular diseases. Relevant studies have revealed the pharmacological and physiological effects of plant essence, such as the use of aromatherapy, and these studies which reported an increase in a significant improvement of agitated behavior in severe dementia patients shed light on the pharmacological and physiological effects of essential oils used experientially. Tactically, physical contact can directly stimulate the intuitive motor area of the cerebral cortex, which has a significant impact on the memory area of the human brain. A number of horticultural experiences have opened up areas for tactile awareness, such as a rain walk in the garden, where the elderly listen to the sound of the rain dripping, and a touch of the cool and slippery banana leaves.

The perceptual system can vividly express the interaction between human and the ecosystem, strengthen the perceptual ability of the elderly, regulate the mental state of the elderly, and play a role in the recuperation of the elderly with chronic diseases.

Thirdly, establish various forms of recuperation activities to build a humanized communication community

Due to different personal experiences, the elderly will have different interests and hobbies. In order to fully meet the physical and mental needs of each elderly in his or her later years, the horticultural community environment should create multi-functional activity areas, such as horticultural operation area, appreciation area, and rest area, which could carry out a variety of practical activities in the operation area to provide various forms of interaction for the elderly. The elderly personally participate in the process of sowing, cultivating, harvesting and natural interaction according to the characteristics of plants in different seasons to organize cultivation, planting, melon and fruit picking practice activities. Relatively simple gardening activities enable the elderly to gain experience from multiple practices and play a role in strengthening the body. Community staff regularly organize art activities such as flower appreciation, poetry recitation and painting in the appreciation area to popularize garden knowledge for the elderly, so that the elderly can enhance their impression of natural scenery in the description and creation, broaden their vision and improve their cultural quality. Rest area is scattered in the whole sanatorium like a network. Through the reasonable arrangement of seat, structures and small equipments to meet the physical needs of the elderly to relax, enhance the comfort of gardening environment, help the elderly better put into gardening operations, thus forming a virtuous circle to promote the elderly fully involved in the interaction of body and mind.

#### **4. Conclusion**

Horticulture therapy, a non-invasive method of treatment, is a new subject of contemporary landscape design research in China. Different from traditional medical treatment, it is a research subject that carries out therapeutic activities through the instinctive recovery mechanism of human body. Under the background of China's aging society, the living conditions of the elderly are getting more and more attention from the society. The introduction of horticulture therapy, a healthy and green treatment method, in the planning of the elderly community can meet the special environmental needs of the elderly, so that the elderly can achieve a good state in psychological and physiological aspects, and thus improve the quality of the elderly life, improve the aesthetic value of the elderly community landscape. At the same time, the introduction of horticultural therapy also provides a new way of solving various social contradictions during the aging period.

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