

Therapeutic Gardens

Evidence-Based Design

Approach*

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Abstract | Clare Cooper Marcus¹ in the book "*Therapeutic Landscapes, an Evidence-Based Design Approach to Healing Gardens and Restorative Outdoor Space*", mentions some factors for medical centers with evidence-based approach and communication with natural environment, including the importance of elderly and children, mentally disabled patients and veterans and wounded warriors, the importance of collaborative design, preparing utilities for gardening and landscaping, the impact of such gardens in solving social problems such as divorce and homelessness, the need for paying attention to rehabilitation patients, considering the differences and advantages of the soft landscape and the state of functional usage of different types of soft and hard landscape, the public dimension of therapeutic gardens and their multifunctional aspects of healing landscape, and in the end, gardening as a treatment. On this basis, in the present article, through an analytical-descriptive approach and after presenting a history of healing gardens and therapeutic landscapes, the authors offer samples of references and explore the theories of Cooper Marcus in the field of therapeutic gardens. As the book *Therapeutic Landscapes* is one of the most comprehensive and authoritative instructions for the design of healing gardens and outdoor spaces of medical centers, the results of the present article are an influential reference for landscape architects and planners, authorities and founders of the field of medicine in order to achieve qualitative features in design and construction of medical centers.

Keywords | Therapeutic Landscapes, Clare Cooper Marcus, Healing Gardens, Restorative Outdoor Spaces, Collaborative Design, Evidence Based Design Approach.

*This essay is regulated based on the translation of the book "Therapeutic Landscapes, an Evidence-Based Approach to the Design of Healing Gardens and Outdoor Restorative Spaces" by "Clare Cooper Marcus" and "Naomi Sachs" executed by "Nazar Research Centre for Art Architecture and Urbanism" and translated to Persian by "Zahra PoursoleimanAmiri".

Introduction | Clare Cooper Marcus in the book *Therapeutic Landscape*², an Evidence-Based approach to Designing Healing Gardens and Restorative Outdoor Spaces, presents comprehensive and authoritative guidelines based on feedbacks from previous built environments, in order to upgrade health level and meeting the needs of a specific group of users. She then gathers and evaluates and rethinks the collected data from planning level to the level of post occupancy evaluation. She also suggests design principles for landscape architects, health center's authorities and founders, based on the needs and demands. Therapeutic landscapes for outdoor spaces, whether for a garden, roof garden or a part of a medical center, a center for special care center for children or cancer patients, prepares comprehensive and proven guidelines. These guidelines include an approach to a stress reduction, encouraging emotional balance, after occupancy or after surgery support and helping patients to regain their ability and health.

In this article the authors look forward to present the most important design principles of the book *Therapeutic Landscapes*, after a review on the history of gardens and healing landscapes. The result of the research beside gathering and screening information about medical centers and evaluating satisfaction level of the users of medical

centers in Iran, could prepare design alternatives which fit the condition ruling on contemporary medical centers and compensation for existing deficiencies for designers and planners of health field, in order to create flexible and environmentally friendly spaces.

Introduction and History of Hospitals in Outdoor Spaces

The importance of outdoor space is undeniable, and connection to nature is vital and beneficial. But in recent decades the environment of hospitals and medical centers has become merely physical and include indoor space far from surrounding environment. Jungle hiking, sitting on park benches, gardening and watching colors and nature's movement from indoor space, are active and passive ways of communication with natural environment. But lack of medical facilities, with limitations in green environment, unconsidered need to privacy, and even weak needs preparation are of the problems that designers face through the design of medical centers (Cooper Marcus & Sachs, 2014).

The word "garden" is mostly used to mention outdoor designed space with dominant greening. The history of garden hospitals and healing spaces backs to centuries ago; at that time nature was considered an inherently healing

Table 1: The history of healing gardens and therapeutic landscapes. Source: the authors (based on the references of the present article).

Theorist or Historical Era	Year	Theory
-	Century 4 B.C. to century 6 B.C.	Aesclepeon in Epidaurus of the first healing places in Greek (Gesler, 2003)
-	17 th century	Corridors in the middle of the courtyards and gardens as important features of the healing environment
John Howard	1726	Hospitals in Marsalis, Pisa, Istanbul, Trist, Vienna and Florence with the chance for wandering in the gardens
Western Europe	1729	Emphasis on an organized death and birth data collection Paying attention to health and air conditioning (Gerlach-Spriggs, Kaufman&Warner, 1998: 15)
Christian K. Lorenz	Late 18 th century	Basis orientation in hospital design and preparing outdoor space
Orthodox	1850	Accepting natural landscape and its direct influence on treatment of mental illnesses and the impact of greenery on the process of healing
Thomas Kurkbride	1851	A series of recommendations for constructing and arranging asylums (today's design regulations)
Nightingale	1854	Concern for warriors and veterans Solving the high rate of death in hospitals (image1)
-	1860	Discovering infection by Scottish surgeon Josef Leyster (Ibid)
-	1990s	Aden as an option, nature as a healing feature
Warner	1995	The advent of romanticism as a reminder for the role of nature on renovation of body and mind
David Abraham	1996	The book <i>A Whisper of Feeling: Communication with nature through our different senses</i>
Darton	1996	Garden hospitals, reduction in death rate
Frampton, Gilpin, and Chamel	2003	Patient-oriented approach and a progressive perception of evidence -based design
-	2003	Professional course of health garden design in the botanical school of Chicago
Mind	2007	Upper self-esteem in people who do jungle hiking in comparison with juggling in suburban lands and lake shores
Ulrich et.al	2008	The relation of design strategies or environmental interventions Progressive motivation in cognition of nature as an influential feature in the process of healing
Kaplan	2008	The level of memory and attention of people who walk for one hour in jungle is 20 percent more than the ones who do the same activity in urban environment
Lie et.al	2008	Walking in jungle reduces the level of adrenaline and the impact of this activity remains for 7 days
Heathcote	2010	The military hospital of Rome, one of the first hospitals, natural lightening and ventilation, any section distinct from the other
Hyun-Ju, Fujii, and Cho	2010	Study on the activity of the nervous system and the cerebellum

feature (Table 1). In 17th century in England, the rich and the nobility changed their houses and gardens to hospitals. This social participatory method in 19th century was called ethical treatment. Accessible scenery and green lands were supposed as an important part of treatment; the lands were gardened and mentioned by the patients. With the advent of modernism and modern medical developments, physical separation in hospitals was no more necessary, indeed low right medical centers which occupied huge surfaces were replaced by single block high rise buildings. Studies on emotions were put on psychology and physical problems on anatomy and medicine; in this way any superstitious belief about body-mind bonding was strongly criticized; outdoor space was deposited to parking lots and services, gardens disappeared and a brief look to nature was limited to the entrance of hospitals (Ibid); (Pics.1 &2).

After World War II, gardening has regained its importance as an occupational therapy subset center. In medical centers physical changes including home decoration, making indoor space natural by the use of plants, aquariums, and joining indoor space to outdoor is provided by preparing views to appealing outdoor spaces. Then cultural and environmental changes made a great change in patients such as increase in happiness and decrease in death rate (Cooper Marcus, 2014). In recent decades, design and construction principles of healthcare centers, including access to nature as a key factor for the formation of physical environment have appeared.

Activists in deep ecology and eco-feminist movement talk about our need to participation and to get in harmony with nature in order to save and continue our lives; (Roszak, Gomes and Kanner, 1995); (Roszak, 1992); (Macy and Johnstone, 2012); (Mckibben, 1986 and 2010).

After 2000 years of the establishment of Epidaurus Healing Center in Greek, we have got back to a perception of body-mind bonding and the influence of nature in the process of healing (Cooper Marcus, 2014).

Theories, Research and Design Consequences

Healing gardens and therapeutic landscapes from Cooper Marcus's point of view².

In recent decades we have faced changes and evolutions in medical centers including rapid changes in medical services, increase in outpatient care and rehabilitation and in-patient care in hospitals, the rapid growth of the number of elderly patients and patients with Alzheimer's disease and dementia. Clare Cooper Marcus as a theorist and planner in the field of restorative outdoor spaces, in the book *Therapeutic Landscapes*, by studying and evaluating related theories in this field proposes collaborative design with an evidence-based design approach (EBD). Evidence-based design approach is an interdisciplinary science including comprehensive design guidelines and regulations in three recent decades (Cooper Marcus, 2014). This process begins with this hypothesis that there is no fixed standard for the design of gardens which are able to meet the varied needs of patients, their families and clinic staff. In order to directly provide the needs of the medical complex, any space is designed distinctly and at the end, these spaces are integrated (Ibid).

The phrase cooperative design is used in different fields of study, such as urban design, architecture, landscape architecture, and medicine. This means a way to create environments for meeting the cultural, emotional, spiritual and functional needs of the residents and users. Cooper Marcus also emphasizes on the protective role of evidence-based studies in the process of cooperative



A corridor hospital sample. Source: Cooper Marcus & Sachs, 2014.

design. Indeed, local cooperation ought to be considered as a running section in management and planning (Kaplan & Kaplan, 1998). In this regard Karpman and Grant enumerate specific advantages for cooperation in design process: helping to revealing design objections, simulating positive thoughts and perspectives, creating a sense of community, and creating a business strategy. In order to have an advantageous cooperation, the role of health care facilities, designers, staff and other users and a skilled and experienced leadership which has the ability to guide the process, is inevitable (Karpman & Grant, 1993).

On the other hand, the environmental psychologists Rachel and Stephan Kaplan (1998) believe that considering the needs of users mostly has a huge impact on cooperative environmental planning, design and management. Cooperation could lead to unique ways of providing local needs in relation to local contexture (Kaplan & Kaplan, 1998). It obviously leads to sense of ownership, supervision and community. These key points for designers, include

professional education, personal meetings with small groups, listening and contemplation and questioning, considering budget and time limitations of the staff, avoiding repetitive design and sharing experiences in the process of cooperative design with designers, and specialists in the field of health. Therapeutic garden is a property for health care facilities; so the time spent in the garden, professional services, considering the level of satisfaction among patients and staff, and upgrading the level of values of cooperative design process, is also of the most important factors.

In the design of outdoor space of a general healthcare center which services different patients, only general guidelines should be considered. But in gardens for specific groups of patients (for example burn patients and Alzheimer's patients), special guidelines are added to general ones. It lately happens if the guidelines about a specific group be contrary with general principles (for example, in the gardens for cancer patients, using aromatic



Pic 2: Roof garden in a hospital for elderly people.
Source: Cooper Marcus & Sachs, 2014.



Pic 3: Children's interaction with garden. Source: Cooper Marcus & Sachs, 2014.



Pic 4: Combination of shadow and sunlight in outdoor space. Cooper Marcus & Sachs, 2014.

plants is not permitted). On this basis Cooper Marcus after data gathering and result analysis, divides general design guidelines in three sections:

- a. Mastery design considerations, responsiveness to all outdoor space components
- b. Planning and garden design considerations
- c. Physical design guidelines for all medical gardens

In addition, security, safety, privacy, accessibility, physical and emotional comfort, encouragement for natural intermediaries (Biophilia), care and aesthetics, planning and landscape design considerations, functional plan, attention to the dwelling population, new structure versus reconstruction and geographical area are of the other factors for applying to all the components of outdoor spaces, in her opinion.

Theoretical and philosophical basis from other theorists' point of view

Based on above mentioned contents, Clare Cooper Marcus in the book *Therapeutic Landscapes* uses theoretical foundations such as the concept of Biophilia, the theory

of shelter landscape, stress-reduction theory, sense of control, access to privacy, positive distraction through communication with nature, attractiveness theory, and emotional conjunction theory, to expand the subject. These factors besides other references in the field of healing gardens and therapeutic gardens form the construction of the present article. In the following, after giving an explanation about the related references in this field, the authors compare and analyze these references with Cooper Marcus points of view (table 2); (Pics. 3, 4).

In this regard Davis (2002) recommends roof gardens for physical treatment; and considering different emotional, psychological and social aspects in the design process. The necessity for a communication between the indoor and outdoor space by the use of windows and social integrity with easy access, refreshing the environment and landscape by the use of natural elements and inducing good sense to all users, being usable in all seasons, using natural alternatives relying on five sense instead of mere use of medicine, emphasis on the necessity of a complete cognition about the needs of patients for designers, and in the end the



Pic 5: Veterans participating in gardening. Source: Cooper Marcus & Sachs, 2014.



Pic 6: Elderly participating in gardening. Source: Cooper Marcus & Sachs, 2014.

impact of healing gardens in physical rehabilitation with the technique of PEO (post occupancy evaluation) in future projects are of her recommendation. Herbert, B. (2003) also in an investigation on history of garden-hospitals, studies the impact of outdoor environment on children and emphasizes on patient-oriented design. From his point of view these gardens should be equipped with different facilities for rapid treatment against stress and

exogenous stimulants. Different levels of designed ramps and protected areas provide patients with gardening in small plant beds. The trace of these gardens is accessible by wheelchairs (Pics. 5 & 6).

Caniano (2006), attempts to develop an interdisciplinary approach in the design of therapeutic landscapes. He emphasizes on the necessity of having a right understanding of the illness and its processes and also the sensitive

Table 2: theories, needs and design guidelines for the construction of healing gardens and therapeutic landscape. Source: the authors (based on the references of the present article)

Row	Author	Theories, needs and guidelines	Design and construction guidelines for medical centers from Cooper Marcus point of view	
			Needs	Recommendations
1	Brad E. Davis(2002)	Gardens for physical treatment considering emotional and psychological and social aspects Necessity of communication between indoor and outdoor spaces by sight gates and spatial conjunction Using eastern philosophy	Considering the whole site as a healing environment Landscape architecture as a part of IDT in the beginning of design process Design in order to service different patients Providing at least one distinct outdoor space for the staff Legible details from the entrance Garden in a silent place Proper proportion of the height of adjacent buildings to the width of open space Curved paths (image 7) Minimizing the intense darkness and light areas on the ground Sufficient space for wheelchairs	Providing more than one garden Providing balconies or traces for the patients or residents Garden far from main traffic areas The garden is open in any climate condition and along the day or night More opportunities and choices in paths hierarchy 7 and 5 circle labyrinth Using trees for the reduction of building scale Using local plants for compatibility with ecosystem Designing water features somehow that could be easily maintained and avoid infection(image 9)
2	Bonnie B. Herbert(2003)	Design guidelines for autism patients The impact of outdoor environment on children		
3	Gina Marie Caniano(2006)	Developing the interdisciplinary approach Focus on need's goals and limitations Necessity of a right cognition about the illness and the process of treatment for designers		
4	Elsevier B.V.(2013)	Making a bridge between the research approaches of china and western countries Emphasis on using Chinese plants and traditional medicine by therapeutic gardening(image 8)		
5	Kenneth I. Helphand(2015)	Unstable gardens in tough environmental, social, political, economic and cultural situations Wartime gardens as a positive driver		
6	M. Francisca Lima(2016)	Necessity for the reduction of hepatitis B, obesity and depression Citing experimental samples for outdoor spaces and considering the beneficiaries in the design process		



communication of the patient with the surrounding environment. He believes that understanding different and paradoxical needs of the patients will be met if the activity is defined in harmony with their abilities and in contact with surrounding environment. To answer these principles a series of guidelines were presented: creating natural drivers with varied wild life, diversity in context and shape and size and seasonal quality of plants, preparing plant boxes, ability to manipulate the environment and create multipurpose spaces and spatial diversity, ease of access, memory stimuli, increased self-esteem, speech control and eye control, autonomy, reduce pressure and anxiety, and reduce crying.

Elsevier B.V (2013), seeking to bridge the existing research approach between China and Western countries, investigated four Chinese schools and had some design recommendations such as the combination of Yin and

Pic 7: The proportion of soft landscape to hard landscape and curved and transparent paths. Source: Cooper Marcus & Sachs, 2014.



Pic 8: A place for social interaction in outdoor space. Source: Cooper Marcus & Sachs, 2014.



Pic 9: Proper use of water elements in the outdoor space of therapeutic gardens. Source: Cooper Marcus & Sachs, 2014.

Yang and the use of five natural elements, including metal and wood, water, fire and soil in gardens, using traditional Chinese medicines and planting medicinal plants, creating spaces for therapeutic activities and encouraging social relationships between people and focus on farming (Pics. 7,8,9).

Kent Hof and (2015) refers to the role of gardens in critical war situations. He has gardens or certain plants that grow on weak soil, as well as gardens in hospitals, highways, campfires, garden bombs (Pic. 2), Landfills, desert fields, and cracks along the sidewalk which he calls unstable

gardens. His studies illustrate the miraculous effect of farming and plant breeding in restoration centers. It has a psychological and nervous refinement and a sense of memory and belonging. Francesca Lima (2016), in his studies of gardens refers to various styles with the combined benefits of mental and physical health, in sunshine and shade (Pic. 4), edible plants, good sense of development, preventing harmful behaviors such as eating and drinking or using drugs arbitrarily, design for spaces that meet the needs of specific groups such as children, passive people or people with high stress are responded here (Pic. 3).

Conclusion | Most of the theorists in the field of therapeutic gardens emphasize on the impact of gardens and landscapes as a part of treatment and recommend general theories for understanding the mental environment of patients, understanding the patient's constraints, getting a sense of pleasure from the environment, the positive effect of landscape on general health, the use of doctors and specialists' opinions in general guidelines, and designing according to need. Cooper Marcus has gone a step further by bringing together theories and history of the subject and by presenting collaborative design theory to find valuable guidelines for the entire design team including investors, shareholders, doctors, employees and patients, and with an evidence-based approach, she enters into details. Design guidelines for different patients have been developed including burn patients, psychiatric patients, children, cancer patients, veterans and dementia patients. On this basis, the cases outlined in Table 3 are a list of possible situations and forms in field observations on visiting more than 100 hospitals and other treatment centers during 1995-2012 in the United States, Canada, Australia, Denmark, Sweden and the UK by Cooper Marcus. Accordingly, walking paths, continuous landscapes of gardens, meadows and landscapes of debt in the absence of cost, maintaining the relation between the space inside and outside, the lack of a ban on future development and being open to the public could promote social activities and accelerate patients' recovery. On this basis Cooper Marcus categorizes therapeutic gardens into debt landscape, nature and health path, courtyard, entrance gardens, back garden, outdoors garden, plaza, roof gardens (Table 2), side garden and garden halls. In general, the important elements of his book as a vast source of information and details include the following:

- Evidence-based guidelines for designers and therapists
- Patient-specific strategies in twelve groups; from burn patients to patients admitted to psychiatric nursing homes and Alzheimer's patients (Pic. 6)
- Case studies of gardens that represent the best practices and inspiration;
- Information on collaborative design and investment strategies
- Areas in the field of research, planting and care of plants, gardening and sustainability

Finally, for practical application of the results of studies based on such approaches in the design and construction of health centers in our country, recognizing and studying the therapeutic role of Iranian gardens, the study of the use of medicinal herbs in orchards and traditional treatments in Iran, comparison of healing gardens with Iranian gardens and studying the possibility of converting Persian gardens into health gardens, are necessary. It's also needed to conduct these studies in Iranian medical centers due to the deterioration of the context of the treatment centers, and in many cases the lack of green space and rest for patients and visitors and many other related issues in the field of Persian gardens. The healing view and the healing landscape are undeniable. At the same time, it should be remembered that the hospital has long been a place for healing and recovery of patients. Today, in many health centers in the country with a lack of open space for air ventilation or improving the mental status of patients in order to accelerate their clinical recovery; hence, the guidelines and methods presented in the Therapeutic Landscape book is advantageous for landscape architects, urban designers, physicians and planners in the field of therapeutic environments.

Table 3: Advantages and disadvantages of therapeutic landscapes.
Source: Authors, based on the references of present article.

Advantages and disadvantages of therapeutic landscapes	
Advantages	disadvantages
Outside walking paths in the space between buildings Walking directions and rest areas to encourage exercise and physical activity Visual connection of gardens spaces to existing buildings on the campus through the thoughtful planting Gardens along trimming grass and flower beds in natural forests or meadows Gardens open to the public and serve social activities	Costly maintenance of green space Expansion of outdoor space at different stages and problems of communication between indoor and outdoor spaces Gardens as barriers to future development of equipment

Endnotes

1. Claire Cooper Marcus is well known for working and studying in the field of social and psychological problems in housing, open space design, environments related to the cycle of life and sense of place. After she ended her professional course of healing she has taken part in landscape architecture and Botanical Gardens in Chicago to teach these issues. Cooper Marcus has always tried to eliminate the gap between research and implementation. As a result of her studies with Marny Barnz in 1999, in the book *Healing Gardens*, healing properties and design guidelines, she published in 2014 the book *Therapeutic Landscape, Evidence-Based Approach to Designing Therapeutic Gardens and Restorative Outdoor Spaces*. Another author of the book, Sachs Sachs, is the founder and chair of the therapeutic landscapes network. She has many speeches and writings in the field of benefits of restorative nature.

2. Evidence-based design (E.B.D) seeks to use the best researches to achieve the perfect plan refers. EBD covers other branches of knowledge to guide decision-making of research they use is different ways. Crick Hamilton's Definition of Concept of EBD is "evidence-based design process is to use detailed, explicit and judicious evidence in research and testing and decision-making in critical situations, the customer with an awareness of each individual project is done in a unique way" (Stichler & Hamilton, 2008: 3). This approach can be maintained, demonstrating and calling other evidence and thereby create an image that covers more dimensions and so will lead to a successful project

3. Tricia Hazen, coordinator of therapeutic landscapes, health heritage, Portland, Oregon

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