■ 研究論文

関西労災病院の庭における利用と癒しの可能性

Uses and Healing Effects of the Garden of Kansai Rosai Hospital

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Abstract : A 5,000m² (approx. 1.2 acres) healing garden were created in Japan at Kansai Rosai Hospital, an acute care general hospital with 20 departments and 670 beds, for patients, their family members and hospital staff members as well as people of nearby communities. This study consisted of two sections: explaining landscape design from design concept in the perspective of healing landscape and use of the concept of universal design to how each detail was determined for use of people who need special care; and investigating how this healing garden were used and evaluated by in-patients, out-patients and visitors using a method of visual physical analysis of the site and asking and recording pre-arranged questionnaires. The study was referred to the case studies conducted in the San Francisco bay area by Marcus and Barnes in 1995. As the results of interviews and records, this study revealed roles of a healing garden at a hospital; such as visual cues, healing space, space for rehabilitation, and place which always welcomes people.

Keywords: *hospital garden, universal design, healing landscape, restorative garden, rehabilitation*

キーワード: ホスピタル・ガーデン, ユニバーサル・デザイン, ヒーリング・ランドスケープ, 休養のできる庭, リハビリテーション

The idea of universal design in natural green space is starting to take root in Japan. The ultimate role of such space is as a place for healing, particularly relevant in healthcare facilities, such as hospitals and nursing homes. Kansai Rosai Hospital is an acute care hospital in Japan. A project to create a hospital garden was included in the last phase of the hospital renovation project completed in 2004. This hospital garden was designed especially for patients of the hospital, their family members, and staff working at the hospital, but it is also open to nearby communities. It is a first of its kind in Japan and has received considerable attention due to its unique concept.

This study investigates the value of this hospital garden through physical analysis and a survey of how it is used. The author of this study is also the original designer of the garden.

Since there is no other similar garden in Japan, the author has reviewed studies of gardens in healthcare facilities in other countries. In the United States, the benefit of natural outdoor settings to people began to be studied in 70's by environmental psychologists such as Ulrich¹⁾ and Kaplan²⁾. Their researches were about the sight of trees out of hospital window has beneficial effects on recuperation of surgical patients. They concluded by just seeing green nature was beneficial for patients, shorten the length of hospital stay, less use of pain killers and showed more positive attitude about surgeries compared with the patient not seeing any green nature. As research continued, gardens for psychiatric patients, elderly people, and people with disabilities became the focus throughout 80's and some effort were published as gardening activities guidebook (Yeomans)³⁾ and design suggestions (Stoneham and Thoday)⁴⁾. In the early 90's, the restorative effect of the natural environment was introduced into the field of

landscape architecture as "healing gardens/ landscapes"⁵⁾, and application was expanded to spaces for children in healthcare facilities. Landscape Architecture magazine featured "healing gardens" in its January 1995 issue⁶⁾, and Cooper Marcus and Barnes published a research report on four case study gardens at hospitals in the San Francisco bay area in 1995⁷⁾. In this report, they categorized hospital gardens in 12 categories in terms of location and design with relation to hospital buildings, then studied use of gardens at four hospital gardens in different categories. They concluded that even though the gardens they studied was in different categories, most of users including patients and hospital staffs enjoy staying in the garden in different ways, and some gardens need improvement. Since then, numbers of case studies and articles on gardens at healthcare facilities have appeared.

Physical Element and Site Layout (Mapping of physical design features)

Since the author was also the designer of the garden at Kansai Rosai Hospital, the garden concepts and design are described according to the visual physical analysis method suggested by Cooper Marcus and Barnes in their publication *Gardens in Healthcare Facilities: Uses, Therapeutic Benefits, and Design Recommendations* (1995)⁷⁾ as follow;

The visual physical analysis of the site incorporated: (1) mapping of the physical design features; (2) circulation and orientation; (3) views into and out of the garden; (4) microclimates within the garden; (5) sensory qualities; (6) opportunities for social interaction; (7) opportunities for privacy; and (8) aesthetic and spatial elements (Id., p.4)⁷⁾.

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The Kansai Rosai Hospital is an acute care general hospital established in 1953 in Amagasaki-city, Hyogo-prefecture. It is built specifically for the treatment of industrial injuries and located in a highly dense mixed-use area facing a heavy-traffic road. It has 20 departments with 95 doctors and 388 nurses, and equipped with 670 beds. The hospital garden was created on the site of an old parking space located in the front area of the main building and launched as a 50-year anniversary project in the hospital's renovation.

The 5,000m² (approx. 1.2 acres) garden, called "Ibuski-no-sono (garden of life)", is facing the hospital building on the west; apartment buildings with shops on the ground level on the south (across a road); heavy-traffic road on the east with a bus-stop and pedestrian crossing; and the hospital's property maintenance building on the north.

A hospital garden must be accessible to all people including children, people with disabilities and elderly people thus the concept of universal design was applied to the design. As a healing landscape, the space must be a place contributes mental and physical healing process of people including people recovering from their illness or injuries and people who are facing to death of their own or close people. A study of healing landscape indi-

cates that a space in which people seek healing needs to be rich in plants and have natural elements which maintain such environment⁸⁾. The study also suggests that such space must be safe and stable as a living space. Another study about healing landscape for people confronting death suggests that people seek protection, rhythm, time continuity, and symbol in their archetypal landscape⁹⁾. From these, three goals were set for the planning and design: 1) to create a verdant, welcoming space; 2) to allow users to experience the healing power of nature; and 3) to develop a system for good maintenance over time. Barnes and Cooper Marcus stated that "for the specific demand of creating a therapeutic space requires an interface between two objectives; creating a place and facilitating a process (1999, p87)¹⁰⁾". Taking this approach, the three goals stated above, and an application of universal design concepts into account, the design of the hospital garden was developed to create a space where; 1) people experience natural cycles, 2) people sense time continuation through the growth of flowers and trees, 3) the five senses are stimulated by - sense of touch, smell, sight, hearing and taste - natural elements, 4) people can meditate, and 5) interaction between people is encouraged. From these concepts, the garden was designed into nine sections which have names representing their features (Figure 1).

Figure 1. Garden drawing indicating different areas, features and Plant List.

1. Hospital Entrance Path Area: This public walk welcomes people with a gate and a series of trees familiar in Japan. These trees show changes of season and time continuation: flowers bloom on some trees in spring and fall, leaves change colors in the fall and drop from some trees during winter, and fresh leaves start to grow in spring again (concept 1 and 2).

1. Hospital Entrance Path Area

2. Garden of Four-Seasons

2. Garden of Four-Seasons: Four sets of raised flower beds are placed on both side of a path and each set of flower beds represent a season of the year. Raised flower beds are wheelchair accessible, so people do not need to bend all the way down to ground level to reach and smell the flowers. In this garden, people are welcome to touch and smell (concept 1 and 3).
3. Garden of Whispering Sounds: This area has two sections; one with water features and the other with semi-private benches facing Japanese maple trees and small cherry trees. There are several devices to make water run down making sounds and a water table thrusting wall between the entrance path and the garden where people can see a part of the garden from outside of the garden wall. People can enjoy the sound of water and play with toys attached on the wall, and a bunch of water plants on a water table trembling in the breeze. Water surface is raised to a height of 30-inches, gives easy access to people in wheelchairs and reflects the surrounding scene. In addition, there is a gazebo which protects people from strong sunshine and drizzling rain, and provides four semi-private spaces with benches. People can enjoy the cherry blossom in spring, the fresh green of maple trees in summer, and red leaves in autumn from these benches (concept 1, 3 and 5).

3. Garden of Whispering Sound

4. Sunshine Square: This open area is covered by lawn with a wide stone path with pillars and a wooden path crossing through the center. Roses are planted along the path between the pillars, which also have hooks for hanging baskets adding

4. Sunshine Square

5. Sunken Flowers

color during winter. Custom made benches are placed at the two corners of this area: two people can speak in a whisper over a small table between them. Author named them as “benches for whispers” (concept 1 and 5).

5. Sunken Flowers: There are bridges over flower beds which are lower than ground level imitating a stream of water. These bridges with handrails on both sides have a flat floor, 4% slope and stairs of common height in town, to use as rehabilitation equipment that make possible to give same programs as those done at in-house rehabilitation room with similar setting for both occupational and physical therapy programs. This setting was included as the result of interviews with physical therapist. Movable benches are placed between bridges along flower beds to watch flowers as well as improvement of patients (concept 1 and 2).
6. Garden of Memories: This special space enclosed with walls and a closed gate is for people to be able to cry. People need a key to enter this garden. White flowers and mild scented plants in this garden provide a tranquil atmosphere. The sound of a small water fountain also eases the feelings of people in this garden (concept 4).

6. Garden of Memories

7. Shimmer Lane

7. Shimmer Lane: Along the lane, there are four semi-closed spaces with benches. In Japan, most of inpatients share a room with 4 to 6 patients, so that private space is important anywhere in hospital. Spaces divided by hedges and walls provide patients semi-private space for spending time alone or with family and friends out of sight of other people. Hedges separate these spaces from other people and noise but front openings provide for security (concept 4 and 5).

Both Garden of Memories and Shimmer Lane are located right next to the heavy traffic road. But by the 2.5m high concrete wall and 4m side, maximum 2m high mounded planting area, hardly noticeable the traffic noise from inside of the garden to sit quiet or to meditate.

8. Sunnyside Common: This open space is covered with lawn and a small wood-deck stage in one corner; a little slide for small children in another corner; and a Zelkova tree was planted as a symbolic tree with several benches in another corner. One of the reason used Zelkova tree was to provide comfortable space underneath the branches by it's beautiful symmetrical canopy shape. Another reason was that is the deciduous tree that envisions the life cycle of tree by seasonal fall leaves and sometimes compared to human's life cycle for help understanding the life time of the patients. The surrounding path is a hundred meters long with a counting device at the gate of the garden. One side of the path bordered by trees, has three different slopes as the way a sidewalk tilts. People who use

8. Sunnyside Common

wheelchairs can experience the difference this kind of small tilt makes on soft surfaced ground, before going out to town (concept 5).

9. Cherry Hill: Cherry blossom has been loved by Japanese people since the Nara-era which can be seen in literary works in 8th century. Cherry trees were planted along a slope. There are sloped walks with 2 different gradients of 4% and 8% to reach to the top of "Cherry Hill". The top end of the slopes is the highest place in the garden to look over whole garden (concept 1 and 5).

9. Cherry Hill

There are two entrances for the garden indicated as (A) and (B) in figure 4: one entrance is facing the entrance path to the hospital (A) and another entrance is located in the center of the east side of the garden (B). The walls around the gates are about 1 m high, so that people can enjoy the view of the garden even before entering the garden. From the first entrance, people can enjoy flowers along the path, and from the other entrance, people can see the whole garden from the entrance.

Most people who visit the hospital use the bus for transportation. The hospital entrance path area is designed to lead people from the bus stop and pedestrian crossing to the hospital main entrance. However, people using this entrance path can have a glimpse of the garden and the Gate (A) is located at the end of path to invite people, while Gate (B) is inviting people in the hospital building.

Gate (A)

Gate(B)

Microclimate and Ambience

Surrounded by buildings, housing and a heavy-traffic road, the garden has become an oasis not only for the hospital but also for people living in nearby communities. Amagasaki-city has a temperate climate all the year round, so people can enjoy the garden throughout the year. This 5000 meter square, newly built garden is maintained well by a team of volunteers called "hospital park gardeners". Shrubs and vines have grown well to cover pergolas in the "four-season garden", and some benches provide semi-

private space for users.

The view of the garden is also enjoyed from a restaurant window in the hospital building and from windows of offices and wards facing the garden during the day and at night while it is lighted up.

The south side of the garden is an open garden where people can feel the sunshine, and most of the trees and flowers are placed for providing shade; colors are provided in the north half of the garden for contrast. Users can select a space according to their body conditions and their feelings.

Since the garden is facing a busy traffic road on the east, quietness is a fundamental; the east end was mounded to distract noise from the road and spaces for quietness placed next to the mound.

Garden Use: Methods

As physical layout, microclimate and ambience, the methods of investigation was also referred to the work by Cooper Marcus and Barnes (1995)⁷⁾ as follow;

The behavioral observation data focused on: (1) traffic flow; and (2) user type (patient, staff, or visitor).

The site was observed, and its uses recorded, for a total of eight hours: 11am-1pm and 1-3pm divided between two weekdays and two weekend days. Each session was divided into six 20-minute observation periods. (Id., p.4)⁷⁾

The traffic flow of the main path from the traffic road to the hospital entrance was not counted, because it was designed as a route from a bus stop to the hospital entrance and is located just outside the garden itself.

In these observations, a person appearing in more than one place during the 20-minutes observation period was counted more than once on the record. Similarly, a person who stayed in one place for more than 20 minutes, was counted twice; once for the first 20-minutes period and another for the second 20-minutes period.

User interviews were conducted to gather the following data;

1. Gender and age group
2. Relation with the hospital (i.e. staff, inpatients, outpatients, visitor)
3. Frequency of visits to the garden (i.e. first time, seldom, once or twice in a week, everyday, more than once a day)
4. Use of the garden (i.e. sit and wait, sit and relax, sit and chat, job meeting, visit with patients, for travel, for walk, for child to play, for outdoor therapy, for meal, others)
5. Length of stay (i.e. few minutes, 5 to 10 minutes, 10 to 30 minutes, more than 30 minutes)
6. What prevented people from visiting the garden
7. Favorite things in the garden
8. Change of the mood after staying in the garden
9. Ideas and requests for change in the garden

Answers to these questions were filled in by several interviewers who approached people using the garden. The interviews were held in the second week of May, 2005 and the third week of October, 2005 from Monday through Friday from 10 in the morning to 4 in the afternoon. The interviewers asked for cooperation on

the survey to garden users at random. Total of 142 people were responded.

Garden Use: Results

The behavioral observations were held on two sunny weekends and one sunny weekday and one rainy weekday in May, 2005. There were no significant differences between weekends and sunny weekday, but more people from the outside visited the garden on weekends and more patients visited the garden on the

sunny weekday. The study showed that some people visited the garden even when the weather was not good (table 1).

Table 1. Number of people used the garden during behavioral observation

	May 1 (Sun.)	May 8 (Sun.)	May 10 (Tue.)	May 12 (Thu.) Cloudy /Rain	Total
Weather	Sunny	Sunny	Sunny		
# in Garden	203	233	227	32	695
Staff	1	0	2	2	5
Patients	53	39	125	12	229
others	129	192	93	16	430

Figure 2 shows the results of the four days of observation. It clearly shows that some benches attract more people than others, and the Garden of Four-Seasons stops people's walking, especially at the second set of flower beds from the north entrance indicated by in figure 2.

Figure 3 shows the picture of the Garden of Four-Season and popular benches and views from the benches which are most popular places to users in Figure 2. At the Garden of Four-Season, people of all kinds including people in wheelchairs were enjoying flower beds because they are planted in raised bed that has about 75cm higher from the floor level to smell and touch easily. Bench 1 is located in Sunnyside Common under the Zelkova tree to be sued for social gathering. Bench 2 is a flat bench located in the center of the garden from where people can

Figure 2. Results of four-day observation and locations of seating

Figure 3. Pictures of the most popular spots and views from the spots.

Figure 4. Circulation and Social Interaction of the Garden and pictures of the entrance path and gate.

enjoy a 360 degree view of flowers and trees. When people lie down, they enjoy the blue sky and white clouds. Bench 3 is a series of semi-private benches with plastic shades, located near water features, suitable for private conversation.

Figure 4 shows the circulation in the Garden. As mentioned earlier, a path on the north side of the garden lead people from pedestrian walk on the heavy traffic road to hospital reception area. The picture in figure 4 shows its welcome atmosphere of the entrance gate with bench next to the arch.

Interviews with Users of the Garden

The interviews were held in Autumn of 2004 and Spring of 2005, and 142 people at the garden responded. 63 people were male and 79 were female. 52 people were inpatients, 47 were outpatients, 35 were visitors, one was a hospital staff member, and 4 people were from neighboring communities. In terms of frequency of visits, it was their first visit for about one fourth of the respondents, but about one third of the respondents visit the garden either 2 or 3 times a week or everyday. One possible reason for this is the use by inpatients; they would visit the garden rather than look outside from the windows of the hospital. 44% of the respondents reported that they stay at the garden 10 to 30 minutes, 9 people stayed for more than one hour, and 4 people visited the garden even though they could only stay less than 5 minutes (Figure 6). This result suggests people like to visit the garden, even if only for a short time. In the case studies by Barnes and Marcus, hospital staff members were found to be major users of the gardens, whereas in the Japanese study, only one person in the interview-sample was a staff member.

The reason for this difference was revealed in the separate survey conducted to the hospital staff members, such as nurses, engineers, and administrative staffs. 600 questionnaires were distributed and 389 responses were obtained (collection rate: 64.8%) and 89 percent of them were nurses. Most of staff members were too busy to visit the garden even during their breaks, and some staff members believed that patients and their families have priority for use of the garden over staff members. The latter

case was the results of lack of communication within the hospital and some improvement have been made. In this survey, although 66% of staff members suggest to their patients that they visit the garden because spending time in a garden reduces stress, staff members themselves cannot visit the garden due to their tight schedules. Hopefully, they at least have time to look down at the garden from the hospital windows.

Figure 5: Relation with the Hospital

Figure 6: Frequency to visit and length of stay

1. How People Use the Garden

Figure 7 shows the way people spend time in the garden. More than half were spending time sitting and relaxing at the garden, more than one third came to look at the flowers and trees, and about one third came for walking.

Figure 7: How people use the garden.

2. What Happens to People in the Garden

When asked how their feelings changed after staying in the garden, 59 respondents (42% of total respondents) did not answer this question. It is not common to ask people about their feelings in Japan, so it is possible that respondents could not think of how to express how their feeling change. The breakdown of the remaining responses is shown in Table 2.

Table 2. Change of respondents' feeling after visiting the garden

Change of feeling	Percent
Calmer, more relaxed	30
Refreshed, escape from hospital room	17
Enjoy garden more	5
Healing experience	3
Others	4
Do not know	1
No change	2
No comment	42

(Number of respondents 142)

Most of the responses expressed positive feelings and only 3 respondents answered "no change". This suggests that the garden fulfills two of its goals: to create a welcoming verdant space, and to offer the experience of healing from garden.

3. What Users Liked Best about the Garden

Some respondents answered with more than one thing when asked about their favorite aspects of the garden. Unfortunately 11% of the respondents did not answer this question, but rest of the 126 responses was sorted into 8 categories as shown in Table 3.

More than half mentioned flowers and greenery. One goal of the garden planning and design was "good maintenance over ti

me". The effort of maintenance volunteers has paid off and is one of the specialties of the garden. Benches were another favorite for about one fifth of respondents, although it was unfortunate that the interviewer did not ask which bench respondents preferred most during the interview.

Table 3. Things most liked by respondents in the garden

	Percent
Flowers and greenery	52
Benches	21
Lawn	17
Whole garden	11
Water features	8
Paths	5
Others	2
No comment	11

(Number of respondents 142)

4. Changes and Modifications Desired in the Garden

Table 4 shows the results of the question asking what kind of improvements or changes are needed in the garden. Since the interviews took place within a year of the garden's opening, some trees were not fully grown which was a reason that respondents mentioned shade, or more flowers and trees. Some requests were a matter of maintenance of the garden, but adding new facilities and equipment is very difficult because the area and budget used for the garden is limited. Some requests were simply impossible because of safety and security reason. Regarding on-duty nurse, a trained horticultural therapist is on-duty Monday through Friday from 9 to 5 working in the garden and helping people to use the garden instead of a nurse.

Table 4. Improvement necessary at the garden

	Percent
Shade/Shade of trees	22
Need of other facilities	17
More plants and maintenance	14
Improvement of facilities	13
Playground equipment	8
No closing hours	1
Presence of a nurse all the time	1
Allow pets inside the garden	1
Do not know	1
No need to improve/nothing to change	78

(Number of respondents 142)

It must be noted that 78 percent of respondents answered that "no need for improvement" or "nothing to change" to the question if the garden need improvement. In another words, they were accepting the design of the garden and its components. However, the author suggests a similar survey at a later date to see if there is any difference as time progresses.

Discussion

In "Healing Gardens: Therapeutic Benefits and Design Recommendation" (Cooper Marcus and Barnes, 1999)¹⁰⁾, Cooper Marcus described 18 types of possible outdoor spaces at acute care general hospitals. According to her typology, Kansai Rosai Hospital Garden would be categorized as an "Entry Garden", a "Healing Gar

den” and a “Meditation Garden”. The combination of these three types of the garden eliminates some disadvantages in each type; by separating the entrance path area from other part of the garden, it eliminates too much exposure from people passing by and does not impede access to the main entrance. Although the garden provides quietness and a certain degree of privacy for garden users, it is enjoyed by a wide variety of users and its use is not limited to “wholistic care”.

Comparing design areas (figure 1) with results of observation map (figure 2) and circulation and social interaction map (figure 4), more people were attracted to the places where they can experience nature through the five senses, such as colorful flowers (sight), waving grasses (sound) and touching plants in the Garden of Four-Seasons, and sounds of water at the Garden of Whispering Sound. Users’ favorite benches permit people to communicate with each other and each has significant views (figure 3).

The results of the surveys suggest that the garden was used as the garden planner and designer intended, for relaxing, enjoying flowers and greenery, feeling nature and interacting with other people, and that many of those users showed the positive response for the garden.

Conclusion

Elements for physical exercise in garden design are often assumed to consist of as play equipment for children, but exercise is seldom seen as important for a healing garden in Japan. In the observation study, only a few people were observed using the sloping side-walk which was intended for physical therapy at the time of this study. So, hospital staffs need to be informed about this potential use of the garden

The author recently visited the garden and interviewed with the on-duty horticultural therapist, a physical therapist, and nurses of the convalescent ward about changes in use of the garden since the time of the surveys. She told of rehabilitation exercises by physical therapists at Sunnyside Common on a regular basis, nurses and family members took a patient in wheel chair for practicing wheel chair handling or for a diversion, and visits of more patients for strolling along garden paths. And the physical therapist told about how encouraging the garden is for patients who lost their motivation towards rehabilitation and how

suitable the grass field is for exercise of people who released from the hospital and want to get back their athletic ability. His program served total of 80 people who were 3 to 6 months from their surgery from injuries (figure 8). He also pointed out about how useful some of our measures, especially plates showing the distance from entrance, different gradients of slope walks, and benches transferable from wheelchairs from the viewpoint of physical therapist.

The nurses of the convalescent ward told us that they receive prescription from physical therapists for weekend activities of patients because physical therapy room is closed during weekends. Some prescriptions instruct the use of the hospital garden, such as walking around the garden or use steps and slopes for exercise. They escort patients to the garden and keep eyes on them while they are exercising. They said that there are more people seen in the garden during weekends. The author also observed a group of young children visiting the garden with nursery staff and playing on a slide located at a corner of Sunnyside Common. These new uses suggest more potential for a hospital healing garden.

The garden of Kansai Rosai Hospital is a visual cue at the entrance; a healing space for people who need a rest; a place for rehabilitation exercises; and a place which always welcomes people. It is the case that was made to serve all the people in hospital and also the community and surly well accepted from many people. The author hopes that hospital gardens like this will continue to spread all over Japan, and that further studies will investigate what would be an ideal garden in a medical environment. For such purpose, further investigation with physical therapists, occupational therapists, and nurses will be necessary to provide not only more therapeutic environment to patients, their families and friends, and hospital staffs, but also healing environment for people from neighboring communities.

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Figure 8: Use of the garden