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PERSPECTIVE ARCHITECTURAL TECHNIQUES FOR THE FORMATION AND DEVELOPMENT OF PUBLIC SPACES IN HOSPITALS

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Abstract

The paper is devoted to important issues of perspective modern directions and methods of organizing public space in hospitals. The innovative world design experience of the newest hospitals is considered, in which places of communication for people were organized in a non-traditional way and received a more functionally intense form. The following latest architectural and planning techniques have been identified and systematized: "pedestrian street", "hospital-park", "courtyard", intuitive orientation and "open room". The experience of the considered ways of organizing spaces for communication, leisure and recreation for visitors, patients and staff of medical complexes in the design of modern healthcare facilities and reconstruction of existing hospitals will significantly increase the emotional and physical comfort of medical buildings visitors, promote design customization and development of healing potential of the architectural environment and consequently improve the quality and efficiency of treatment delivery.

Keywords: Architecture; Public space; Space for communication; Hospital; Additional features.

1. INTRODUCTION

Modern hospitals are complex and large-scale systems that should provide effective treatment while creating and radiating a compassionate, supportive, and caring environment for patients who are the most vulnerable psychologically and physically during illness [1, 2]. To achieve this goal hospital projects should be created individually, taking into account many specific circumstances of the urban environment, traditions, and culture, the way of community life [3, 4]. A sick person who gets to a health care facility is always antsy, emotionally unbalanced, and needs a special and individual ambience. A person's temper can swing - for a while, he needs to be alone, and then the feeling of loneliness begins to create additional discomfort and anxiety. Therefore, taking into account these circum-

stances, when designing a modern hospital, the architect should organize a public space for comfortable communication of visitors, patients, and hospital staff with all the hallmarks of traditional public urban communication places [5, 6]. From this point of view, a modern hospital should be designed as a public building that fully takes into account the regional characteristics and context of the area, culture, and its inhabitants [7, 8].

The scientific problem is to identify and organize perspective architectural techniques for the formation and development of public spaces in hospitals in order to increase the level of social and psychological comfort of patients and staff of medical institutions.

2. METHODOLOGY

The study of the architectural environment of university hospitals was conducted on the ground of systematic, comprehensive, functional, and historical approaches. Some research methods used in the paper are: inductive statistical, abstract-analytical, comparative and historical analysis method, qualitative and quantitative analysis method, data collection, and systematization from various information sources. To organize public spaces in a hospital, it is advisable to use the following methods: urban planning, functional, planning, compositional, stylistic, artistic, conceptual.

The urban planning method is used at the stage of selecting a site for the construction of a hospital and provides for the application of the individual context of the urban planning environment. If the construction of a hospital is planned in a large city with a high population density, a busy and active rhythm of life, it must be reflected in the public space of the hospital. In this case, the hospital should be able to provide the maximum number of additional services that a city dweller encounters on a daily basis in his everyday life. This will not only increase the level of comfort for hospital staff and patients (access to services, save time), but also create conditions for additional earnings of the medical institution (in the form of rent, etc.). The functional method is designed to identify the most optimal location for public space zones and their number. The planning method, using the data obtained when applying the functional method, makes it possible to clarify the dimensions, configuration and other parameters, to identify the architectural features of the public space in the structure of the hospital building. The compositional method allows you to create an interesting volumetric-spatial solution of a public space, thanks to the use of traditional compositional instruments (rhythm, meter, symmetry, scale, etc.). The stylistic method allows you to identify and emphasize the visual solution of the hospital public space, its relation to a particular architectural style or direction of architecture development. The artistic-figurative method is aimed at the formation of the symbolic or semantic content of the public space, for the formation of its philosophical meaning. The conceptual method allows to form a general concept of the organization of public space, which unites and subordinates all the used methodological components of the project (urban planning, functional, planning, compositional, stylistic, artistic methods)

3. INNOVATIVE PRACTICAL EXPERI-ENCE OF PUBLIC SPACE ORGANIZING IN HOSPITALS

3.1. "Pedestrian street"

The arrangement of the so-called "pedestrian street" is one of the newest design techniques for the organization of internal space for interaction and communication for visitors, patients, and hospital staff, i.e. a fairly wide and long public hospital space, where you can relax, communicate and choose the necessary support services, which we meet every day [9, 10]. Additional features of the "pedestrian street" may include a variety of catering establishments (cafes, cafeterias, snack bars, fresh bars), shops, pharmacies, bank branches or vending machines, a hairdresser, a laundry, a flower shop, etc. This unique opportunity to live a normal life, to choose individually what they need is very important for patients who have to spend a long time in the hospital [11]. The actual use of this approach can be illustrated by the example of Sunshine Coast University Hospital, designed by Architectus and HDR and built in 2017 in Birtinya, Australia (Fig. 1) [12]. Analysis of the project reveals the use of urban planning, functional, planning, compositional techniques.



Figure 1. Sunshine Coast University Hospital, Birtinya, Australia. Source: https://media2.architecturemedia.net/site_media/ media/cache/2b/8c/2b8c9d5ab87a9278b9a1bf4e9e333ad0.jpg

The Sunshine Coast University Hospital project integrates an extended two-story area for the movement of visitors, patients and staff along with recreation areas and additional features are arranged (Fig. 2).



Figure 2.

Internal public space unit in the form of a "pedestrian street" at Sunshine Coast University Hospital, Birtinya, Australia. Source:

 $https://media2.architecturemedia.net/site_media/media/cach\ e/15/7f/157f7fe6c0eea55ccf9596816456a2c8.jpg$



Figure 3.

The "pedestrian street" at Sunshine Coast University Hospital, Birtinya, Australia. Source: https://architectus.com.au/wp-content/uploads/2019/09/ ba_hea_scuh_28_300ppi-1600x1068.jpg

Similar planning of a long "pedestrian street" along the entire medical complex can be seen in the University Hospital Sant Joan de Reus project in Reus, Spain (Fig. 6) [13, 14]. In addition to designing a spacious public space for communication, walking, recreation and concentration of additional services, the use of this architectural technique allowed to create an original three-dimensional shape of the hospital with a long three-story atrium, which allowed additional use of natural light in the central part of the building (Fig. 7, Fig. 8). In this project, it is possible to highlight the use of urban planning, functional, planning, compositional, stylistic, artistic-figurative and conceptual methods.



Cafe in the "pedestrian street" at Sunshine Coast University Hospital. Source: https://unita.com.au/wp-content/uploads/2017/10/SunshineCoastUniversityHospital_Cas ual_Dining-6.jpg



Figure 5.

"Street musicians" the in "pedestrian street" at Sunshine Coast University Hospital. Source: https://www.abc.net.au/news/image/10897172-3x2-700x467.jpg



Figure 6.

University Hospital Sant Joan de Reus, Reus, Spain. Source: https://archello.com/thumbs/images/2012/10/30/N7X2444. 1506068786.7895.jpg?fit=crop&w=1920&h=1080



"Sports ground" in the "pedestrian street" at University Hospital Sant Joan de Reus. Source: https://images.adsttc.com/media/images/51e9/55e4/e8e4/4ea5 /2600/00cf/newsletter/_N7X12010.jpg?1374246357

3.2. "Hospital Park"

The use of a large number of planting and other elements of landscaping in outdoor and indoor space allows architects to give the hospital the atmosphere of a park or garden, which, of course, evokes positive emotions and distracts from thoughts of morbidity. The arrangement of concentration centers of wildlife, especially in the urban environment of megacities, becomes an attractive magnet for society and at the same time provides various forms of stay together. The patient can choose the desired level of communication: active communication and new acquaintances, a walk in the "park" next to other people, or a cozy stay and enjoy nature alone [15, 16].

Healthcare projects of the last decade are increasingly



"Pedestrian street" in University Hospital Sant Joan de Reus, Reus, Spain. Source: https://cdn.archilovers.com/projects/c_383_1326529780a54b ba8da7fa0fcfc6a46a.jpg



Figure 9.

Scoul National University Hospital Medical Mall, Scoul, South Korea. Source: https://www.greshamsmith.com/project/scoul-national-university-hospital-medical-mall/

demonstrating the attention of architects for the integration of landscape design into medical facilities. Seoul National University Hospital Medical Mall, Seoul, South Korea can serve as a vivid illustration of "hospital park" idea (Fig. 9) [17]. In the Seoul National University Hospital Medical Mall, it is possible to highlight the use of urban planning, functional, planning, compositional, stylistic, artistic-figurative and conceptual methods organization of hospital public space.

The constructible surface of the hospital is located in an urban environment with compacted buildings and has a small size. That is why Gresham Smith architects have come up with an innovative concept that a sixstory hospital building should be "immersed" in an underground space – a rather bold idea that is entirely unusual in the design of health care facilities. But this concept allowed to develop another uncharacteristic approach - the arrangement of a landscape park in the area free from land construction. To provide sunlight to Gresham Smith architects, a multi-story atrium was designed, which opened up a magnificent view of the park inside the medical complex (Fig. 10, Fig. 11) [18]. Thanks to a large number of atriums glazing and the emphasis on integrated nature, the architects managed to avoid the perception of the building as underground, while creating a unique and bright aesthetics.



Figure 10. "Hospital park" method in Seoul National University Hospital Medical Mall project, Seoul, South Korea. Source: https://www.greshamsmith.com/project/seoul-national-university-hospital-medical-mall/



Figure 11.

Sectional drawing of Seoul National University Hospital Medical Mall project, Seoul. Source: https://www.greshamsmith.com/project/seoul-national-university-hospital-medical-mall/

3.3. "Courtyard"

The next interesting method of organizing the public space of the hospital stems from the understanding of the hospital complex as a micro model of an area with a specific courtyard, which serves as a place of communication for residents. That is the main functional units are organized around the building perimeter and the central part serves as a communication core. This approach helps to reduce the area of corridors and is typical of relatively compact and multi-story hospitals, which are limited in the area under construction. An illustration of the method of the "courtyard" can be Haraldsplass Hospital designed and built by C.F. Møller Architects in 2020 in Bergen, Norway (Fig. 12) [19].

By contrast with traditional hospital plans, Haraldsplass Hospital does not have traditional long corridors for hospitals. Instead, C.F. Møller Architects used an open model of the interconnection of separate functional units, which are united around two "courtyards" – places of rest, communication, and communication of all residents and visitors of the medical complex (Fig. 13, Fig. 14, Fig. 15) [20].

This state-of-the-art planning approach has provided efficient logistics, flexibility, and closeness between staff and patients. The two courtyards of the hospital are formed in the form of multi-story atriums, which additionally provide daylight to the building, as well as contribute to better design, form interesting views from the interior windows and facilitate orientation. At the Haraldsplass Hospital, the use of urban plan-



Figure 12.

Haraldsplass Hospital, Bergen, Norway. Source: https://images.adsttc.com/media/images/5c17/c158/08a5/e5c8 /b900/0171/medium_jpg/04_Haraldsplass_Hospital_photo_ by_Joergen_True.jpg?1545060616

ning, functional, planning, compositional, stylistic, artistic and conceptual methods of organizing the hospital's public space can be distinguished.



Figure 13.

The sectional view of the building Haraldsplass Hospital. Source: https://arqa.com/en/architecture/haraldsplass-hospital-new-ward-building.html



"Courtyards" view Haraldsplass Hospital. Source: https://arqa.com/en/architecture/haraldsplass-hospital-new-ward-building.html

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The Haraldsplass Hospital. Source: https://www.floornature.com/cf-moller-architects-expansion-norwayas-haraldsplass-hospita-14337/

3.4. Intuitive orientation

Architects' consideration of the special features of the area when designing the hospital contributes to a sense of intuitive orientation in an unfamiliar architectural space. In particular, this is important when it comes to a large-scale medical complex with many multi-story buildings and their connecting corridors, and the patient's attention and concentration are out of focus and unbalanced. The importance of introducing intuitive orientation was taken into account by the architects of Architectus and HDR when designing Sunshine Coast University Hospital in Birtinya, Australia (Fig. 16). The landscape of the Sunny Coast, where the hospital was planned to be built, has a unique natural geometry of the area with a beach in the east, mountain ranges in the west, and a magnificent view of the sun from the north. The city has traditionally formed a clear linear urban axis emphasized by a transport artery from north to south, which was emphasized by the blue of the eastern beaches and the deep perspective of the land in the west. This socially established geometry was built into the idea of the microcosmic architecture of the hospital, its orthogonal planning [21]. Accordingly, the main routes of public traffic (pedestrian axis of the hospital) run from north to south forming a "linear street". The in-patient department bulks are oriented to the east, opening to patients wonderful and soothing panoramas of the ocean horizon, sunrise, and sailing ships. Of course, this philosophical and seemingly veiled architectural technique, which provided the kinship and intuitive connection of the man-made environment with the natural, contributes to the formation of its own healing properties of the hospital

building, which radiates a sense of comfort and tranquility in unfamiliar conditions. At the Sunshine Coast University Hospital, the use of urban planning, functional, planning, compositional, stylistic, artistic and conceptual methods of organizing the hospital's public space can be distinguished.







3.5. "Open room"

The Sunshine Coast University Hospital is another important way of making people comfortable in the health complex, which consists of open and semiopen, cozy, outdoor recreational areas, filled with elements of the object and landscape design interspersed with free spaces and sites equipped with structures for protection against sun, wind and rain (Fig. 17, Fig. 18).



Figure 17. Use of "open room" method in design Sunshine Coast University Hospital. Source: https://architectus.com.au/wp-content/uploads/2019/09/ ba_hea_scuh_14_300ppi-800x581.jpg



Figure 18.

The "open room" in design Sunshine Coast University Hospital. Source: https://architectus.com.au/wp-content/uploads/2018/08/ba_hea_scuh_18_72ppi.jpg

A feature of the hospital's exterior design concept is the formation of a large integrated central courtyard or "open room" – an outdoor space designed to take advantage of the local climate, coastal lifestyle, and healing properties of natural air and light [22]. These basic spaces use the natural environment and landscape to create a hospital that combines buildings with the landscape, seamlessly linking inside and outside. It is important to emphasize the exterior design of hospitals, landscaping, and filling of their territory, which are the first to "meet" visitors and patients and help to make a first impression of the medical institution, its hospitality and care for people.

4. CONCLUSION

Today we need changes in the traditional approach to the architectural design of hospitals, which for a long time were considered exclusively as "machines for treatment", as a physical shell for conducting and providing treatment processes [23]. In this sense, in many countries, particularly in the post-Soviet territories, a typical industrial approach to the design and construction of health care facilities has been used. It certainly solved the problem of the quantity and cost of construction of medical buildings in a short time but also got several disadvantages: ignoring the regional peculiarities of the area, the aesthetics of the architecture intended for health care, the comfort of individual personality rather than a faceless unit of measure to calculate statistical indicators. A person always needs the opportunity to choose the intensity and method of communication with society. Especially during illness, when he or she is often confined to a hospital ward for long periods. The introduction of new areas in the architectural and planning structure for social communication of patients with each other, with visitors and staff, will significantly accelerate the recovery process and the level of feeling of general comfort during treatment.

The paper proposes and discusses the use of the following methods for the formation of public space in hospital buildings: urban planning, functional, planning, compositional, stylistic, artistic and conceptual methods. Among the promising architectural techniques for the formation and development of public spaces in hospitals, the following are proposed and illustrated: "pedestrian street", "hospital-park", "courtyard", intuitive orientation and "open room".

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