

# A new perspective on the role of the occupational therapist in the home rehabilitation of people with physical disabilities

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## Abstract

Research shows that housing and health are inextricably linked. People with mobility impairments, whether in wheelchairs or on crutches, face a variety of impediments to urban infrastructure on a daily basis, both within their own home and in their immediate surroundings. The research shows that disability may be decreased by adapting the environment. The home modifications improve functioning and decrease dependence, impact on general sensation, participation, and higher self-assessment of health. Housing adaptations were identified as one of the ten most promising 'preventive interventions' for older people with physical disabilities. Adapting a home to the needs of people with mobility impairments requires a comprehensive, individual approach. Interdisciplinary cooperation among specialists from various scientific fields – technical, medical, and social – significantly increases the effectiveness of projects. Occupational therapists play a key role in helping patients and their families to plan a safe, functional and comfortable home environment, supporting home healthcare services. Occupational therapists better understand the physical, social, emotional, sensory and cognitive aspects of the person and the relationship between the person, environment and occupation. The aim of the publication was to show the importance of adapting a flat to the needs of a person with a disability as an important element of supporting the rehabilitation process in the living environment. Particular attention was paid to the role of the occupational therapist as an expert who understands the relationship between the person, the environment, and the occupation.

**Key words:** ergonomics, client-centred, home adaptations, occupational therapy, people with disabilities

## Introduction

Occupational therapy is an integral component of the rehabilitation process. The goal of occupational therapy is to restore, maintain, or mitigate the functional consequences of an illness or injury, and to achieve an optimal and satisfying quality of life. In the contemporary biopsychosocial model of perceiving health and illness, the broad competences of occupational therapy in the field of helping and supporting people with disabilities are becoming very desirable. Occupational therapy sees the person as a whole, in conjunction with the environment in which they live. It focuses on abilities, as well as environmental and personal factors that facilitate everyday functioning.

Disability is a serious social and economic challenge for modern healthcare systems.

Worldwide, the prevalence of moderate and severe disability is estimated at 15% of the general population and 50% among people over 60 years of age [1]. These people experience many everyday problems related to physical functioning and barriers in their immediate environment, i.e. home, flat or community [2]. The lack of appropriate spatial conditions and problems with accessibility often limit basic activities and increase dependence and dependence on other people [3].

Research shows that disability can be reduced by adapting the environment [4]. Several studies have shown that home adaptations improve functioning, reduce dependence on others, affect well-being, participation and higher self-esteem regarding health [2, 5–7]. An environment that is not inclusive restricts participation and fails to promote health and enhance health action [8].

The UN Convention on the Rights of Persons with Disabilities mandates that states take measures to increase the personal mobility and independence of persons with disabilities when using private and public spaces. The home environment is the most important human space and also the most intimate. Having an independent home, its appropriate size, functional-spatial structure, and quality standard, leads to the achievement of goals such as: stable existence, sense of security, acquisition of the required living space and satisfaction, and happiness. In the case of people with disabilities, integration needs are also important: social integration, connectivity and interpersonal contacts, freedom and liberty as well as fitness and self-actualisation, which make up the overall quality of life [9].

A study of people with disabilities conducted in Poland in 2017, commissioned by PFRON (National Disabled Persons' Rehabilitation Fund), revealed that they are a group at high risk of social exclusion, poverty and deprivation [10]. The most important need was identified by people with disabilities to be able to live independently in their own flat, adapted to the disabilities present. Equally important was the need to use assistive services, devices, appliances or technologies that help to eliminate limitations in everyday life, as well as the need related to mobility, adaptation of means of transport and elimination of architectural barriers in public space.

The aim of the work was to show the importance of adapting a flat to the needs of a person with physical disabilities as an important element of supporting the rehabilitation process in the living environment. Particular attention was paid to the role of the occupational therapist, a well-prepared specialist

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who understands the physical, social, emotional, sensory and cognitive aspects of a person's functioning, as well as the relationship between the person, environment and occupation [11].

## Housing adaptations in research

Research shows that housing and health are inextricably linked [11]. The World Health Organization (WHO), in its Ageing Policy Framework document on active ageing, emphasised that a 'supportive physical environment' promotes independence and can prevent further illness and/or disability [12]. In contrast, living and functioning in an unsuitable and 'oppressive' home environment can exacerbate disability and impair quality of life. Disability can be reduced by modifying the home environment. Modifying the home environment minimises difficulties in daily activities and reduces the burden on the carer. For older people over 65, who spend more than 80% of their time at home, home adaptations have a positive impact on their quality of life, health and well-being and, globally, on public health [13].

Home adaptations have been identified as one of the ten most promising 'preventive interventions' for older people [14]. The benefits of modifying the home environment include increasing the effectiveness of fall prevention strategies. Adapting homes late can increase the risk of falls, hospitalisation and associated medical costs. One study showed that homes with simple modifications had 33% lower treatment costs for fall injuries compared to unmodified homes [15]. Research in the UK has shown that a delay of 1 year in adapting a home for older people can increase the cost of home care by £ 4,000, which is comparable, for example, to the cost of a completed bathroom adaptation. To prevent or delay further disability, the Care Act 2014 places a duty on local authorities in England to provide housing adaptations that would prevent or delay the need for other health and social care services [16]. These data support the economic case for undertaking relatively inexpensive housing adaptations, including the installation of safe fall prevention features. Evidence of the benefits of these measures was provided by a large randomised controlled trial (Randomised Controlled Trial) conducted in New Zealand. It showed that carrying out minor and low-cost repairs and modifications to the home environment of people requiring disability support reduced fall-related injuries in the intervention group by 26%. It was therefore considered that this could be a way to reduce injuries in the general population [17]. At the same time, a long-term (longitudinal) study in Sweden showed that with each month that participants waited to adapt their housing, their difficulty in performing daily activities increased [18].

## Problems in adapting a flat for people with mobility impairments

People with mobility impairments, in wheelchairs or on crutches, have to cope with various obstacles in the urban infrastructure, both in their own home and in the immediate surroundings.

Adapting a flat to the needs of people with mobility impairments requires an individual approach, not least because of the variety of conditions involved. A person in a wheelchair will have different needs from a person using crutches or a person with manual problems. The layout and size of the home itself are also important. Persons with mobility impairments require increased communication and manoeuvring space

(which increases with the degree of impairment) and additional storage space in the flat, due to their reduced capacity to reach and grasp with their hands (e.g. from a sitting position). The housing of a person with a lower level of disability is intended to enable them to fulfil all the needs that are characteristic of all people, regardless of their psychophysical condition. The standard of housing is therefore determined by its ergonomic quality of the factors determining the conditions for satisfying their housing needs [19].

Traditional ergonomics, originating from the science of work, has until recently (also with regard to the disabled) dealt mainly with the work environment, forgetting the fact that the quality of work depends on the quality of rest. Hence, the need arose for a more thorough analysis of the residential environment, especially in terms of its quality (e.g., functional, technical, aesthetic), which in effect creates the 'quality of life' of an integrated society [20].

## Difficulties of wheelchair users

A dwelling designed for a wheelchair user should have a functional and ergonomic space to facilitate independence and self-reliance. Wheelchair users may have different degrees of disability and varying abilities. Some people use their arms and hands to get around, others can get out of their wheelchair and walk a short distance alone. In a flat with sufficiently wide doorways and passageways, it may be sufficient to rearrange the furniture and add some helpful elements, such as handrails. Unfortunately, small and poorly planned flats may require more expensive and troublesome renovation or reconstruction. The appropriate layout and size of rooms should be taken care of from the design stage [1], taking into account the motor capabilities, the ability to grasp and the reach zones of people in wheelchairs in the functional and spatial design. In adapting a dwelling for people in wheelchairs, one basic and very important factor is the averaged dimensions and reach of a person in a wheelchair. These data are the basis for determining guidelines, e.g. for the height of function buttons, handles and shelves and tops (furniture) and for providing free surfaces for free movement [21].

## Housing adaptations – benefits

Most diseases, dysfunctions, and disabilities lead to reduced mobility. The priorities for home environment modifications carried out depend on the current and anticipated future disease states, environmental limitations and patient/client capabilities [22].

Since the mid-1990s, universal design standards have been in place to maximise accessibility and functionality while maintaining aesthetics and minimising the need for future modifications. Key features of universal design include step-free building entrances, wide doorways and corridors, and extra space to allow easier use of a wheelchair and other assistive devices. They also help the carer, by providing extra space when assisting in the bathroom or bedroom, for example.

Carrying out adaptations enables a person with a mobility impairment to remain in their own home/flat, in a familiar neighbourhood and able to engage with the community [23]. In addition, home adaptations can prevent or delay the transition from community living to supported living or residential care. The cost of home modification may be small compared to the cost of transfer to a nursing home [24].

When designing or modifying the home environment, it is important to ensure safety (prevention of injury), maximisation of functional capabilities and, where possible, independence. Modern solutions in interior design are able to realistically increase the comfort but also the independence of people with disabilities. Therefore, it is worth taking them into account when adapting a flat for their needs. The resulting freedom of functioning is a big step towards 'living without barriers'.

### Adaptation of housing for people with mobility impairments

Housing adaptation has been defined as 'any permanent change carried out to a building to make it more suitable for a disabled person' [25].

#### Adaptation goals

- Space structuring – ensuring clear and uncomplicated communication relations between rooms and elements of the surroundings, appropriate development and individual selection of ergonomic parameters, taking into account the needs and requirements of the user.

- Safety – providing a safe, cosy and warm interior, without imposing unnecessary restrictions.

- Maintaining independence – looking for adaptations that make it possible to perform daily activities without the help of others; help to maintain self-esteem and a good quality of life.

In all rooms, it is a good idea to provide plenty of natural light and, in the case of artificial lighting, to choose warm colours that promote a positive mood. There should be stable, non-slip floor surfaces and floors of similar texture throughout the home. Thresholds, faults and single steps between rooms should be avoided. The minimum width required for wheelchair passage is 120 cm, a rounded or chamfered corner is advisable with a 90-degree turn. For room doors that open outwards, the corridor into which they open must be widened.

### Adaptations

#### Internal staircases

Internal staircases should have a rough structure to prevent slipping. The maximum step height is 15 cm, width 25–35 cm. Handrails should be placed at a height of 110 cm (in single-family houses and 90 cm in flats) and extend 30 cm beyond the beginning and end of the stairs. Two handrails are required if the staircase is wider than 125 cm. The handrail should have a rounded shape (easier grip) and a non-slip surface (better grip). To assist persons with very limited ability in moving independently, it is necessary to purchase a special hoist enabling transfer from bed to wheelchair, to the bathtub, and to the toilet, as well as a special rehabilitation bed, which increases the patient's comfort in everyday life – it is used not only for sleeping but also for staying in during the day, work and rehabilitation.

#### Kitchen

A properly designed kitchen enables a disabled householder to participate fully in home life. It is a place where attention should be paid, above all, to functionality and safety.

An important issue is the height of the worktops, ensuring adequate space for a wheelchair to roll up, and placing cabinets at a height that allows access and use of their contents. In the cupboards, swivel shelves may be useful instead of traditional ones. The fridge should be low and the gas cooker replaced by an induction hob. An oven placed 40 centimetres above the floor level will enable comfortable use in a sitting position, without excessive lifting of hands or awkward tilting. A dishwasher installed at a suitable height will also work well. The following elements should be taken into account when adapting the kitchen: non-slip flooring surface, minimum manoeuvring surface (150 cm diameter circle), height of working surface (80–85 cm), worktop depth (55–60 cm), worktop width (min. 90 cm), space for a standing surface at the sink and cooker (min. 40 cm), opening of kitchen cabinet doors (110–180°).

#### Bathroom

It is very important to adapt the bathroom in order to be able to carry out hygienic activities independently and to make it easier for a person who needs assistance to do so. In the case of unassisted persons, adaptations are needed to remove the bathtub and replace it with a wheelchair-accessible shower (the shower tray should have a non-slip bottom and be flush with the floor), to adapt the toilet, to place a mirror and the washbasin so that their height is adapted to the person sitting in the wheelchair. Handrails and shelves should be mounted low as far as possible to provide easier access for the disabled person.

The installation of handrails and handholds will provide safe support and prevent slips and falls (height of horizontal handholds from the floor 75–90 cm). Installing a chair or bench (e.g., a sliding one) to sit on while bathing will be a convenience when getting into a standard bathtub. An easy-to-install raised toilet seat will improve sitting and getting up from the toilet and reduce the risk of falling. For people who are not very independent in bathrooms, special ceiling lifts, which allow the resident to be moved to specific locations, such as the bath and the toilet, will work well.

The inability to bathe independently is thought to be a precursor to increasing disability in older people. One of the first BATH-OUT studies to assess the effects of interventions on improving or maintaining full independence while bathing was conducted by Whitehead et al. [27]. Those who experienced living in such an adapted living space indicated that the improvements made definitely affected their physical functioning at home (cleanliness, sense of security, control), and quality of life appeared to be a secondary benefit [28].

#### A place to work

Regardless of the size, every home has a separate room or dedicated space for work. For people who spend a lot of time working from home, designing a comfortable and well-equipped workspace is essential. For wheelchair users, the most important thing is to keep enough free space at the desk because of the need to manoeuvre. In order to increase the working area of a desk, a system of pull-out desks, extensions or mobile tables and shelves or telescopic monitor stands mounted to the wall can be used. The hanging shelf system above the desk should be within easy reach of the wheelchair user (the height depends on the depth of the desk and the reach of the wheelchair user and should be checked individually). Drawers shall be secured against falling out and fitted with pull-out slides.

## Furniture in a disabled person's home

The less equipment in the home, the better for the disabled person. Furniture should have no sharp edges or corners that can snag clothing or cut them. Cabinets should open 110–180 degrees, which is much wider than an average piece of furniture, but sliding doors are also the most convenient. For a wheelchair user, the bottom edges of cabinets should be at a height of 40 cm from the ground. Shelves in cabinets should be extendable; they can be openwork baskets.

## Occupational therapist

### The role of the occupational therapist

Occupational therapists play a key role in helping patients and their families plan a safe, functional and comfortable home environment that supports home health care services. Their knowledge, skills and competence in making home adaptations are still underestimated and marginalised by institutions [29]. The contemporary occupational therapist educated in academic institutions in Poland is well prepared to make home visits, during which they:

- assess the living space, i.e. the person's home environment, their functional status and the extent of functional deficits, the level of independence and the autonomy and the demands of the person in the context of conditions of physical, mental and social functioning
- propose introducing specific solutions and facilitations
- recommend measures to facilitate the creation of a barrier-free living space: functional, ergonomic, aesthetically pleasing and economical, ensuring self-sufficiency (as much as possible and for as long as possible) as well as safety and health during its use, according to individual needs
- provide advice and support in solving problems related to the provision of orthopaedic and technical equipment, application of new technologies used in everyday equipment, and seeking sources of finance for the adaptations to be carried out
- provide training in the ergonomics of their performed activities and use of assistive devices
- in the case of people with severe disabilities, help to support them to live with dignity [30].

## Priorities and areas of evaluation for the occupational therapist

### Priorities

- What are your biggest concerns at the moment?
- What is most important to you?
- What can we do to help make a difference for you and your family?

### Assessment areas

#### ADL

- How do you manage: bathing, toileting, dressing, eating, walking (mobility), writing?
- How does the injury/disease/diagnosis affect your functioning, how you look after yourself?

#### IADL

- What does your typical day look like?
- How does your condition affect the activities you enjoy each day?
- How do you cope with daily chores, meeting people, managing household affairs, getting around (transport)? [31]

## Conclusions

The home environment is a key determinant of health, quality of life and well-being. Housing adapted to the needs of people with reduced mobility provides opportunities for social rehabilitation, gainful employment and economic independence.

Creating an environment that meets the needs of people with disabilities requires a comprehensive approach to the problem of universal design, accessibility and adaptation of houses. Studies on reducing disability in ageing populations need to consider the role of housing modifications as key interventions to promote healthy ageing in place. In research on housing interventions to reduce the risk of disability, there is hardly any mention of interdisciplinary teams around accessibility [10–14]. The literature suggests poor collaboration between stakeholders as a barrier to the broader acceptance of universal design [15]. Universal design is not a high priority in architecture education and the design communities [16]. Occupational therapists can be valuable partners in inter-professional projects. Architects do not have the knowledge and direct access to the perspective of the disabled people for whom they design. Occupational therapy praxis has knowledge about the physical, sensory and cognitive aspects of disability and the relationship between person, environment and occupation [32].

Occupational therapists play an important role in the assessment of the home environment and in the development of concrete solutions and facilities. They provide information, advice, support and are actively involved in the decision-making process of clients and carers, which contributes to satisfaction with the adaptations carried out. Research shows that the participation of occupational therapists in home modifications for people with disabilities improves accessibility, safety, privacy and independence, especially when performing self-care activities. The effectiveness of community-based interventions is increased when an occupational therapist is involved [33].

## Ethical approval

The conducted research is not related to either human or animal use.

## Disclosure statement

No author has any financial interest or received any financial benefit from this research.

## Conflict of interest

The authors state no conflict of interest.

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