International Handbook of Occupational Therapy Interventions

Chapter 4
Environmental Adaptations for Older Adults and Their Families in the Home and Community

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The OT provided various items that made my life easier and comforted me. It gave me a new outlook. I realized I don't have to succumb to my physical difficulties and I won't.

—An 84-year-old woman living alone at home

Abstract Environmental adaptation is an important intervention to help older adults remain at home independently and ease the burden of care on their families. A range of adaptations can be considered, including removing or rearranging objects, special equipment, and adaptive tools. Providing an environmental adaptation involves assessment of a person's needs and capabilities and the environment's physical properties; choosing an adaptation; ordering and installing it; and training the older adult and family member in its use. This chapter provides an overview of environmental adaptation as an intervention for the elderly, clinical principles, and the evidence to support this approach.

Keywords Adaptive equipment • Assistive devices • Frailty • Home modification

Definitions

Environmental adaptations refer to strategies that modify the physical environment, with the goal of supporting and enhancing everyday competencies of persons with physical or cognitive functional challenges (Gitlin, 2001). There are three basic forms of environmental adaptations: assistive technology, structural changes or home modifications, and material adjustments.

Assistive technology (AT), also referred to as special equipment or assistive devices, reflects a wide range of equipment and device choices of varying complexity and cost. Special equipment includes various attachments to a home structure (handrails, grab bars, stair glides). Assistive devices refer to "any item, piece of equipment, or product system, whether acquired commercially off the shelf,

I. Söderback (ed.), *International Handbook of Occupational Therapy Interventions,*
DOI: 10.1007/978-0-387-75424-6_4,

modified or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Technology Related Assistance for Individuals with Disabilities Act of 1988). An assistive device can be attached to the home structure or applied to or directly manipulated by a person, such as a wheelchair, walker, cane, or reacher.

Structural alterations or home modifications refer to changes to the original home structure (widening doors, lowering cabinets), including electrical or plumbing work (installation of first-floor powder room).

Material adjustments include alterations to the nonpermanent features of a home (e.g., clearing pathways, removing throw rugs, tacking down carpets, adjusting lighting, rearranging furniture, and color coding or labeling objects.

Use of an environmental adaptation typically requires a behavioral adjustment or a change in the way a person interacts with his or her physical environment. Behavioral adjustments, for example, may include changing footwear, modifying task performance (e.g., sitting on a high stool when preparing meals), simplifying tasks (e.g., pacing self, planning ahead), or changing the function of a living area, such as converting a living room to a bedroom (Gitlin, 1998).

As a therapeutic modality to enhance competencies in older adults, an environmental adaptation is grounded in a Competence-Press Model (Lawton and Nahemow, 1973; Wahl and Gitlin, 2007). This model provides a broad, overarching framework allowing different types and levels of competence such as sensory loss, physical mobility loss, or cognitive decline, and environmental factors including housing standards, neighborhood conditions, or public transport, to be considered. The fundamental assumption of this model for aging persons is that there is an optimal combination of (still) available competence and environmental circumstances, leading to the relative highest possible behavioral and emotional functioning for that person. The model also suggests that it is at the lower levels of competence that older people become the most susceptible to their environment such that low competence in conjunction with high "environmental press" or demands negatively impacts an individual's autonomy, affect, functional capacity, and well-being. A related point is that as competencies decline, the zone of adaptation narrows such that environmental choices that can promote well-being become increasingly more limited, although there is always an option. Within this framework, adjustments to the environment are designed to obtain the right *person-environment fit* to maximize competence.

The role of environmental adaptation as a therapeutic intervention is also supported by prevailing models of disablement, which posit a pathway or trajectory from pathology (a disease state) to performing everyday living tasks with disability. In these models, disability reflects a gap between a person's capability, the demands of a particular task, and the social and physical environment. Verbrugge and Jette's (1994) disablement model suggests the environment is highly relevant to two related aspects of competency: an individual's ability regardless of context, which is referred to as intrinsic ability; and an individual's ability as supported or constrained by the person's physical and social environment, referred to as actual disability.

Here the implication is that the interaction between a person's intrinsic abilities and the built environment, including both its physical and social characteristics, yields actual disability. One conclusion from this model is that disability can be conceptualized as representing an outcome of potentially modifiable environmental factors and can therefore be minimized (Wahl and Gitlin, 2007). Hence, the role of the living environment and its adaptation is paramount in prevailing models of disability and well-being.

Purposes

Environmental adaptations have multiple purposes including a prevention role, such as the use of grab bars for reducing the risk of a fall in the bathroom; a maintenance role, such as the use of task lighting to enable continued participation in a valued activity; or a compensatory role, such as the use of a mobility aid (e.g., cane) to compensate for an underlying impairment. Additionally, adaptation can enhance the ease, safety, and efficiency of everyday performance.

Method

Environmental adaptations are used with increasing frequency by older adults themselves and by health professionals to address age- and health-related functional consequences that compromise daily participation in valued activities (Mann et al., 1995). As a therapeutic modality, it is typically integrated in rehabilitation and home care therapies. Care systems for this therapeutic intervention vary worldwide, with some countries integrating the approach in a sophisticated network of home and community-based services (as for example in Sweden or England). However, in the United States, most older adults who live at home with a functional difficulty do not have access to environmental modification services unless they have a need due to an acute condition, are referred for rehabilitation by a physician, or seek such assistance themselves and pay out-of-pocket. Access to modification services varies widely regionally and there is a complex web of funding mechanisms and no uniformity in assessment, type of modifications available, and training.

Candidates for the Intervention

Environmental adaptations can be helpful to older adults in a wide range of settings (e.g., home, community-based centers) and with varying health and functional challenges including cognitive loss, physical limitations, or sensory changes. Individuals

with cognitive impairment may benefit from adaptations involving simple changes to the living environment and ways of performing everyday tasks (Gitlin et al., 2003). Examples of useful adaptations for individuals with cognitive impairment may include, but are not limited to, memory boards, labeling or use of other visual cues including color coding, and removal of clutter or unnecessary objects to promote way finding and in specified areas in which particular tasks are performed (e.g., eating at the kitchen table). Devices such as tub benches, grab bars, and commodes are useful as well. However, more complex technologies (e.g., medication monitoring devices, stair glides) that require new learning may not always be appropriate and need to be determined on a case-by-case basis. Older adults with vision impairments can also benefit from a range of adaptations including, but not limited to, optical devices, color coding, environmental simplification, task lighting, or enlarged clocks, telephones, and reading materials (Horowitz et al., 2006; Wahl et al., 1999).

Recent research suggests that older adults with even subtle physical functional changes such as getting in and out of the tub, or carrying out the garbage, warrant the use of this intervention approach (Gitlin et al., 2006b). Individuals at most risk for functional decline such as those who are over 80 years of age, women, or those of low education, benefit even more than their counterparts from learning and using environmental adaptations (Gitlin et al., 2008). Thus, even the oldest old can improve by using environmental compensatory strategies, and hence this group of elderly persons in particular who are at most risk of frailty should be targeted for this type of service. Although most older adults are willing to make changes to their living environment to address physical limitations, in general this population, particularly in the United States, is relatively unaware of the range of modifications possible and tends to have limited access to services involving assessment and training in the use of equipment, nor are such services typically available or paid for through third-party payers or health insurance programs.

The Role of the Occupational Therapist in Applying the Intervention

Effective use of environmental adaptations requires an occupational therapist (OT) to makes an assessment of the person and the living environment, coordinate or identify a process for obtaining and installing equipment or the home modification, and then instruct the client in its use. In implementing this intervention, OTs may need to work with other professionals including a care manager is coordinating care for the individual, a contractor who may need to install the device (e.g., grab bar, hand rail, or stair glide) or construct the modification (e.g., widening a door), and a family member who may need to learn how to assist or support the older adult in using the modification.

Results

Clinical Application

Providing Environmental Modifications

Providing an environmental modification is a skilled intervention requiring knowledge of an individual's functional, cognitive, and sensory processes, an understanding of the effect of the physical environment on behavior, and an understanding of person–environment dynamics as they unfold in the performance of everyday activities of living (Hagedorn, 2000).

Assessment

Numerous environmental assessments have been developed to evaluate dimensions of settings including the private home, nursing home, or special care unit, and with specific populations, such as residents with dementia, or the physically frail (Gitlin, 2006). Although there is growing recognition of the importance of home assessment, the conceptualization and measurement of living environments remains complex. Moreover, there is not an agreed upon or uniform approach, nor has environmental assessment been incorporated into routine geriatric or traditional home care in the United States.

Existing environmental assessments differ as to their measured characteristics, response formats, and source (self-report, direct observation, proxy) from which ratings are derived. Assessments are either descriptive, in which specific features are identified and described, or evaluative, in which measured dimensions represent desirable attributes, or a combination of the two. Examples of measured dimensions are physical characteristics (lighting, distances, and space); safety; affordance of daily activities (accessibility, prosthetic aids); support of orientation (way-finding); social interaction (privacy and socialization); and support of novelty, stimulation, and challenge. Response formats tend to be nominal (presence or absence of a condition), although ordinal and interval ratings have been developed to reflect the extent to which a desirable attribute is present. Ratings can be obtained through self-report, observation, or both. There is some evidence to suggest, however, that older adults do not accurately report their environmental conditions, and that professional observation yields more reliable information particularly when it concerns home safety and environmental modification needs (Carter et al., 1997; Ramsdell et al., 1989).

Environmental assessments of private residences date back over 30 years in gerontology, with an initial focus on neighborhood and dwelling features. Recent efforts focus on home safety (Johnson et al., 2001) for physically frail older adults (Gitlin et al., 2002; Oliver et al., 1993; Westmead Home Safety Assessment) and

are designed and used primarily by health professionals for discharge planning, rehabilitation, or functional maintenance purposes. The Home Environmental Assessment Protocol (HEAP; Gitlin et al., 2002), is an observational tool designed for use in homes of persons with dementia to assess safety, and home modifications in support of function and orientation. Only one assessment, the Housing Enabler, uses a transactional approach in which a person-environment fit index is derived by rating physical features of homes based on a person's capabilities (Iwarsson and Isacsson, 1996). The derived score reflects accessibility or extent to which an individual can access different home features.

Clinical Principles

The provision of an environmental adaptation must be based on certain clinical principles common to the provision of geriatric services overall (Table 4.1). First is that the therapist must assume a client-centered approach. That is, the therapist must involve the client's perspective in problem identification, decision-making, and identification and implementation of specific modifications. Individuals tend to be selective in the types of adaptations that are accepted and may choose one strategy over another based on a wide range of considerations that are not well understood in the research literature. Understanding and respecting a client's preferences is an essential ingredient in this approach.

Another core principle is that since adaptations occur in people's private living space, sensitivity to the meaning of objects and environmental configurations is essential. Objects and environmental setups reflect cultural preferences, long-standing values, and hidden meanings (Oswald and Wahl, 2005). What may appear as a simple alteration that may be helpful to an individual (such as rearranging furniture to enhance way-finding) may disrupt a person's sense of normalcy and long-standing preferred environmental placements. Furthermore, the process of identifying environmental solutions involves problem solving with clients as to their performance difficulties and occupational goals, barriers and supports to performance, and potential environmental solutions. Yet another principle is tailoring. Solutions must be customized to the particular person–environment and cultural and occupational context, with the most effective training actively involving the client through use of demonstration and hands-on practice sessions. Each of these treatment principles is informed by evidence and reflect best practices.

The implementation of a particular environmental solution involves five basic considerations (Table 4.2). These include making small incremental changes to an environment so as not to overwhelm clients and facilitate their adaptation to the change, involving family members when appropriate to support new learning and sustained safe use of modifications, providing only those adaptations that are agreed upon, and providing education about resources for obtaining other adaptations that may be necessary in the future.

Table 4.1 Core principles guiding practice involving environmental interventions with older adults

Core principle	Description	Select evidentiary support
Client-driven	Collaborative approach to identify older adult's valued activities and specific performance challenges and explore environmental solutions. Older adult should be viewed as a partner who has valued information about his or her daily challenges and personal functional goals. Client preferences need to be identified and respected. Not every adaptation will be acceptable or perceived as useful to the client such that a range of adaptations should be offered and discussed with only those that are acceptable implemented.	Toth-Cohen et al. (2001)
Cultural relevance and understanding	View of home as a microculture reflecting values, beliefs, and preferred approaches to carrying out daily activities of self-care. Therapist must identify and understand the specific cultural influences shaping older adult's daily participation choices and what changes in the environment would be acceptable.	Brach and Fraser (2000)
Problem solving	Process of helping older adult identify performance difficulties, environmental barriers, and explore potential environmental solutions. Also, serves as an approach to modeling for older adult to address environmental barriers to effective functioning.	Davis (1973)
Customization	Tailoring of specific environmental strategies to match environmental specifications, person-identified concerns, capabilities, and culturally appropriate solutions.	Richards et al. (2007)
Active engagement	Use of active strategies to instruct older adult in use of adaptations. Use of demonstration, role play, and observed practices are effective.	Chee et al. (2007)

Table 4.2 Key clinical considerations

Make small or incremental changes in the environment, particularly for individuals with cognitive impairments.
Only make those changes acceptable to and agreed upon by the client and family members.
Use catalogues, pictures ,or sample devices as exemplars so that client has realistic understanding of the possibilities.
Allow ample opportunities for practice and refinement of the adaptation if necessary.
Include family members if so desired by the older person in the assessment, adaptation selection process, and training.

Evidence-Based Practice

Knowledge about the evidence of environmental adaptations is emerging. There are several different data sources that support this approach. First, large-scale epidemiologic research consistently shows a relationship between increasing frailty and

use of adaptations, suggesting that this is one of the preferred approaches for compensating for decline (Manton et al., 1997). Similarly, studies using population-based samples have shown that use of special equipment is associated with enhanced self-efficacy, whereas reliance on help is not (Verbrugge et al., 1997). Another source of supportive evidence for this approach is from randomized clinical trials with family caregivers and frail elders in which environmental supports are one of the treatment components. While there are few of these studies, they consistently show positive treatment outcomes including reduced falls in fall-risk elders (Cumming et al., 1999), enhanced functioning (Gitlin et al., 2006b; Mann et al., 1999), reduced fear of falling reduced risk of mortality (Gitlin et al., 2006a), and enhanced caregiver self-efficacy and the dementia patient's quality of life (Gitlin et al., 2003). As environmental adaptations tend to be embedded in multicomponent interventions, it is difficult to tease out the specific effects of any one adaptation on a particular behavior or health outcome. Nevertheless, there is a growing consensus that environmental adaptations are an important component of multifactorial approaches to address the complex consequences of chronic illness in older adults.

Discussion

Environmental adaptations mitigate impairment and disability by reducing the press in the environment or demands that exceed a person's capabilities. Of importance is that adaptations be designed to enable an individual to continue participation in a valued occupation.

Existing environmental adaptation services have several limitations that must be noted. First, in many countries, and particularly the United States, there is a lack of funding and necessary supports for the delivery of this therapeutic approach. Existing community-based programs typically have eligibility requirements or programs are specific to a region, or are limited in scope with monetary caps or restrictions on the types of environmental modifications that are available. Second, there is the lack of awareness among consumers and health professionals as to the importance of involving OTs in the assessment and training process for such adaptations. As a skilled intervention, OTs have the requisite knowledge and skill for matching persons and environments with adaptive strategies. Third, this approach requires not only an assessment by an OT but also follow-up training. Often, training and follow-up are not provided due to agency budgetary considerations. Fourth, limited research is available on the relative benefits of any one type of adaptation for specific person–environment configurations so that therapists must often depend on their own experience or collective wisdom. Finally, the evidence is mixed as to whether environmental adaptations prevent falls, whereas there is stronger evidence of its benefits for reducing functional difficulties and enhancing the ability to engage in valued occupations (Mann et al., 1999; Wahl et al., in press).

Acknowledgement This work was supported in part by funds from the National Institute of Mental Health, National Institute on Aging grants RO1 AG22254 and R01 AG13687, and the Pennsylvania Department of Health, Tobacco Funds SAP 4100027298.

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