

# Assistive Technologies for People with Dementia: Personal Review

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## Chapter 5 Various Non-Pharmacological Approaches

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### 5.1 Review of various Approaches

To reduce the stress of individuals with dementia and the burden on caregivers, various interventions have been introduced (Yasuda, Kuwabara, Kuwahara et al. (2009). In parallel with pharmacotherapy, Various non-pharmacological approaches have been implemented to address the emotional needs that cause the inappropriate behaviors. These include doll therapy, physical activity programs, music therapy, aromatherapy, massage and touch, and art therapy. Systematic reviews of literature published in the Cochrane Library have demonstrated reductions in BPSD following the use of physical activity, music therapy, aromatherapy, massage and touch, and art therapy (Fernandez, Arthur, & Fleming, 2013).

The American Psychiatric Association (APA) has described four different psychotherapeutic approaches that can be useful for treating people suffering from dementia (Carrion, Aymerich, Baillés et al., 2013). (1) **Cognition-oriented approaches** (reality orientation, skills training, spaced-retrieval intervention, cognition oriented approaches etc. (2) **Emotion-oriented approaches** (supportive psychotherapy, reminiscence therapy, validation therapy, sensory integration, simulated presence therapy, diversional therapy etc. (3) **Behavior-oriented approaches** (behavioral therapy, activity, physical exercise, Montessori therapy, job therapy etc. (4) **Stimulation-oriented approaches** (recreational activities or therapies, music therapy, dance therapy, art therapy, exercise, multisensory stimulation, aromatherapy, play therapy, gardening therapy, animal assisted therapy, lighting therapy, cosmetic therapy, fashion therapy, massage therapy etc.

**Brain exercise:** There is also recent anecdotal evidence of the effect of brain training using video games. 'Brain exercise' products have been marketed, promising to help people stay mentally fit and even help prevent dementia. However, research does not support these claims as yet. In a review of studies, they found no good evidence that brain training prevented or slowed down mental deterioration in healthy older adults (Carswella et al., 2009).

**Errorless Learning:** Errorless learning (EL) technique requires learning or encoding new information without error. In order to achieve this result, prompting cues are given to the person before he/she could commit an error. This process is repeated over multiple trials, until the individual can complete the whole task without the help of those cues. The effectiveness of an errorless-

based technique was investigated in facilitating the learning and the retention of procedural components of three new routes with a woman with mild AD. Results showed that there was over a 50% mean increase in participant's ability to travel along the two routes, following the intervention. (Caffo, Hoogeveen, Groenendaal et al., 2013).

**Reality Orientation Training:** RO training is a widely employed technique to improve the ability to deal with reality of confused elderly people and people with dementia. Such technique has been used in the rehabilitation of persons with memory deficits, episodes of confused behavior, and time–place–person disorientation. There are two main forms of RO: (a) class RO, in which information about time, place and significant life events of the patients are presented and actively rehearsed every day for about half an hour under the supervision of a therapist, and (b) 24 h RO, which involves the whole staff every time they interact with the patients during the activities of daily living and at other times. The usefulness of 24 h RO in reducing ward disorientation was reported for four out of five patients (Caffo, Hoogeveen, Groenendaal et al., 2013).

**Cognition Oriented Approaches:** Our research results suggest that reality orientation is effective in slightly slowing down functional impairment in people suffering from dementia, bearing in mind that slowing functional impairment does not mean slowing disease progression. However, studies are too heterogeneous to identify which intervention might be more suitable for mild, moderate or severe levels of dementia. There is a possibility that the intervention itself may be teaching patients to answer cognition tests. In addition, data from several studies showed that improvements tended to be unstable and disappeared sometime after the intervention had finished (Carrion, Aymerich, Baillés et al., 2013).

**Cognitive Stimulation Therapy:** Cognitive stimulation approaches have the potential to assist in striving towards therapeutic goals such as minimizing psychomotor behaviors, enhancing social relationships or reducing caregiver distress (Yuill & Hollis, 2011). Cognitive stimulation is an intervention for people with dementia which offers a range of enjoyable activities providing general stimulation for thinking, concentration and memory usually in a social setting, such as a small group. A wide range of activities were utilized to stimulate thinking and memory generally, including discussion of past and present events and topics of interest, word games, puzzles, music and practical activities such as baking or indoor gardening.

The findings suggested that cognitive stimulation has a beneficial effect on the memory and thinking test scores of people with dementia. There was evidence that the people with dementia who took part reported improved quality of life. They were reported to communicate and interact better than previously. No evidence was found of improvements in the mood of participants or their ability to care for themselves or function independently, and there was no reduction in behavior found difficult by staff or caregivers. Family caregivers, including those who were trained to deliver the intervention, did not report increased levels of strain or burden. The intervention does not appear to be appropriate for people with severe dementia (Woods, Aguirre, Spector et al., 2012).

As research suggests that rehabilitation of cognitive function is biologically possible, cognitive stimulation approaches may have therapeutic benefits for individuals with mild to moderate dementia by facilitating the delay of progressive cognitive impairments. Such approaches must not be confused with cognitive training, which typically involves guided practice on standardized tasks such as recall of items on word lists; this strategy is somewhat controversial as it fails to consider cognition within a real-life context and as there is no significant evidence that it is beneficial. Efforts to develop person-centered cognitive stimulation approaches have emerged within recent years (Yuill & Hollis, 2011).

**Simulation Presences Therapy:** Simulation presences therapy (SPT) was successful in alleviating 'problem behaviors' such as social isolation, verbal aggression or agitation. An example of nighttime assistive success was reported where one resident required antipsychotic medication every night for episodes of screaming. The need for medications was eliminated. **Recreational therapy** was studied by Lee et al. The study introduced **gardening therapy**. Gardening could provide a sense of accomplishment, create no extra care-giving workload, be easily integrated into environment; and be enjoyable for both caregivers and people with dementia (Carswella, McCullagha, Augustoa, et al., 2009).

**Craft therapy** was explored for the benefits of crafts as memory triggers in reminiscence sessions with older women in residential

care who had severe symptoms of dementia and had enjoyed crafting as a leisure activity during their lifetime. Three structured reminiscence sessions, involving different kinds of handicrafts, craft material, and craft tools, were used to trigger memories and offer multisensory stimuli. Multisensory triggers activated nonverbal and verbal reactions, sustaining attention and prompting interaction and nonverbal communication. The most interesting triggers stimulated recall of forgotten, pleasing craft experiences (Pöllänen, and Hirsimäki, 2014).

**Doll Therapy (Fernandez, Arthur, & Fleming, 2013):** Doll therapy is based on the *attachment theory*. The impact of attachment experiences is evident from childhood through adult life. For people with dementia, attachment behavior can be observed at various stages of dementia. Searching for deceased relatives has been reported when attachment needs were not being met.

The use of dolls for therapeutic purposes involves giving a doll to a person with dementia to care for and is purported to assist in overcoming some of the attachment needs. For example, cuddling and caring behaviors towards the doll are said to be an expression of being needed, feeling useful and being able to care for others. In addition, hugging a transitional object such as a doll is representing security during a period of uncertainty. Doll therapy has been reported to reduce agitation, aggression and behaviors of concern in people with BPSD. Doll therapy as a strategy in managing challenging behaviors in people with dementia has not yet been quantified in a manner to enable clinicians to make an informed decision about its benefits.

**A motorized toy dog** can effectively reduce wandering and agitation after dinner in people with dementia. The robot dog AIBO as well as a motorized toy dog proved to be effective in increasing patient activity and spontaneous speech during occupational therapy. The introduction of AIBO increased the number of utterances in people with dementia. These results indicate that socialization and social activity can increase in the presence of a toy dog and AIBO (Lauriks et al., 2010).

**Cognitive Training by PC:** Specialized software and commercial devices including the possibility of cognitive gaming has been placed into the market; most of them are based on neuropsychological models of cognitive aging, but few have been scientifically tested. Cognitive training includes specific stimulation regarding to concrete processes such as memory or language, as well as more general tasks based on broad constructs such as attention or speed of processing. The level of difficulty must be in accordance with capabilities: difficult enough to mean a challenge for the elder, but not so difficult that becomes frustrating. Little attention has been placed in this field on older adults' prospective memory stimulation, despite its importance on their daily living (Buiza et al., 2009).

**Cogmed Working Memory Training** is a home-based program to improve executive function by training working memory capacity. In brain injured patients after stroke, Cogmed Working Memory Training was found to have an effect on short-term memory tests, on a paced auditory serial-addition task (Buiza et al., 2009).

In mild and moderate stages of dementia, computerized cognitive training in combination with other cognitive stimulation programs has shown improved outcome scores in cognitive performance. **Smart brain**'s efficacy with the cognitive stimulation in Alzheimer's disease has been demonstrated in a single blind randomized study. Patients receiving Smart brain training began at the lowest level of difficulty from 15 levels, increasing the level of difficulty automatically after three consecutive performances. After 12 weeks and also after 24 weeks, significant differences were found in standardized measures of cognitive function, but not in functional assessment nor in specific neuropsychological tests (Buiza et al., 2009).

**Recreation Therapy:** By the observations of people with dementia, meaningful activities are often lacking, by providing more stimuli and activities, such people's quality of life can be improved. In his list, most attention is paid to the active involvement of the person with dementia, first, to support and facilitate the person's memory, orientation, and other cognitive abilities; second, to enable the person to carry out tasks and activities. Third, such active involvement is also necessary to facilitate meaningful occupation during the day, including leisure activities, and the maintenance of valued roles in the family and other social networks (Topo, 2009).

Many individuals with memory impairment seem to lose interest in their familiar hobbies or activities; they may appear apathetic or depressed about life. When questioned about what they might like to do, they cannot think of anything to

suggest. Before assuming the person is really not interested in doing anything, consider that the memory impairment might be the culprit (Bourgeois, 2007).

The person may not recognize the words used to invite him or her to do something or may not understand them. Written and graphic memory supports can be very helpful for maintaining interest and engagement in preferred activities and hobbies. A visual prompt may be more effective than the verbal cue because objects and written words are permanent and static; in comparison, auditory information in the form of words, phrases, and sentences is transient, often disappearing into thin air. Life-long hobbies and interests will always attract more attention and interest than generic recreational activities designed for the older adult (Bourgeois, 2007).

The *INDEPENDENT* project, having ascertained from people with dementia and carers what they would most enjoy, developed several devices, most particularly a music player, designed to be easy to use for people with cognitive impairment. *Talking Mats* is a communication tool that uses a fabric mat and a series of cards to support people to express their views. They tested it with people with dementia and found that it was indeed effective (Bowes, Dawson, & Greasley-Adams, 2013).

Schikhof, De Lange, & Goumans (2012) targeted games for the iPad that can be played independently and individually by people with dementia. If playing games enables people with dementia to do meaningful activities on their own; activities that will give them pleasure and a sense of achievement. If this is the case, game-playing can be dually beneficial, i.e. for the people with dementia and for the caregivers. The Rotterdam University of Applied Sciences is developing a number of games. The outcome led to the following selection of themes for concept games: pets, the outdoors, hobbies, sports, and shopping. The first experiences of designing the new games and the new iPad cover shall be shared in the symposium (Schikhof, De Lange, Goumans, 2012).

**Laughing Therapy:** To evaluate the effect of laughter on cognition in elderly with mild cognitive impairment (MCI), the intervention was tried to watch a Japanese comedy routine Manzai (Yamamoto, Mizuno, Aota et al., 2012). Manzai is one of a traditional style of stand-up comedy in Japan, which usually involves two performers. The intervention led to significantly higher cognitive scores in exercise, word memory, and animal name recollection domains, suggesting that interventions focused on laughter and simple exercise may improve cognition in elderly patients with MCI. A lot of data from previous study shows effects of cognitive function from diversional therapy. It is important to consider about cultural and individual contents for elderly people in each country.

**HERMES-Cognitive Care and Guidance for Active Aging (Buiza, Feli, Facal et al., 2009):** This project is co-funded by the European Commission. The main aims of the HERMES project are facilitation of episodic memory. HERMES captures user's daily life information through audio and video means as well as information on the context. HERMES also provides reminders through visual and audio patterns in order to strengthen prospective memory.

The first step in the HERMES project was to clearly identify the user's needs as well as their preferences about the new technologies. The results showed that most of the healthy older adults studied stated they would appreciate a device to play some cognitive games. Older adults want a device to remind them. The situations in which they feel most uncomfortable due to forgetfulness are buying something or doing any task; how to get somewhere, forget names; an important appointment and conversations. Technological external aids should be easier and simpler than the aids currently used. Most of the participants forgot from 5 to 7 events per week.

HERMES have the goal of encouraging autonomy and sense of independence by means of making use of information introduced into the system by HERMES users about their own daily life. This distinctive aspect will allow them to stimulate prospective memory directly addressed to daily events. Users' motivation has been taken into account, especially in order to promote user long-term motivation and adherence to daily gaming experience.

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