

ASSISTIVE PRODUCTS FOR PERSONS WITH DEMENTIA

Editor
YASOICHI NAKAJIMA



NATIONAL REHABILITATION CENTER
FOR PERSONS WITH DISABILITIES
JAPAN

(WHO COLLABORATING CENTRE)

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The National Rehabilitation Center for Persons with Disabilities was designated as the “WHO Collaborating Centre for Disability Prevention and Rehabilitation” in 1995.

The terms of reference are shown below.

1. To research and develop technologies for primary health care to maintain health condition of persons with disabilities (PWDs) and health, medical, and rehabilitation services to prevent and alleviate disabilities.
2. To develop technologies for the improvement of social skills and promotion of economical independence in collaboration with PWDs.
3. To study and develop social systems for PWDs, such as primary health care, social care, etc., in the community.
4. To research and develop affordable assistive products and its service, in collaboration with PWDs.
5. To prepare manuals for education and training of professionals in health, medical, and welfare services for PWDs.
6. To conduct training programs, conferences, and/or seminars on rehabilitation of PWDs for dissemination of technologies and information.

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Assistive Products for Persons with Dementia

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Editor: Yasoichi NAKAJIMA

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Fumio Eto, M.D., Ph.D., President

4 - 1 Namiki, Tokorozawa, Saitama Prefecture 359 - 8555, Japan

Tel. 81-4 -2995-3100

Fax. 81-4 -2995-3102

E-mail: whoclbc@rehab.go.jp

PREFACE

In Japan, with the enforcement of the Services and Supports for Persons with Disabilities Act in 2006, physical disabilities, mental disorders, and intellectual disabilities have become integrated in their operation, by which an increasing number of institutions that used to exclusively deal with physical disabilities has started addressing pathopsychosis. The National Rehabilitation Center for Persons with Disabilities is no exception; it implements rehabilitation for those with higher brain dysfunction or developmental disability and has created this manual based on the research result for dementia. Both contributors, belonging to the Department of Assistive Technology in the Research Institute, have been engaged in extremely novel research for building concrete assistive products in an abstract field like dementia.

The researchers' task of developing assistive products for persons with dementia included asking themselves what persons with dementia are puzzled with and what kinds of assistive products can be used by persons with dementia. This task must have been a challenge because of its novelty. I would like to praise their efforts as they have borne fruit today with the publication of this manual. It is very significant that the contributors took a step into this field, given that this field will definitely evolve at a terrific speed from now on.

Y.NAKAJIMA

EDITOR

Yasoichi NAKAJIMA

National Rehabilitation Center for Persons with Disabilities

CONTRIBUTORS

Rina ISHIWATA

National Rehabilitation Center for Persons with Disabilities

Takenobu INOUE

National Rehabilitation Center for Persons with Disabilities

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Contributor

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Introduction

The purpose of this rehabilitation manual is to introduce ways for assisting persons with dementia by using assistive products that promote community-based rehabilitation. In Japan, where people have the longest life expectancy in the world, it is predicted that the number of elderly with dementia will reach 3.5 million, and one out of 10 elderly people will suffer from dementia in 2030. Increase in the number of elderly people with dementia has been observed in many aging countries in the world, and assistance of persons with dementia is a common challenge in those countries. In order to keep the quality of life (QOL) of persons with dementia, it is desirable that they continue their lives in a familiar community as long as possible. In Japan, while it used to be common in the past for two to three generations to live together, the number of elderly couple households and single elderly households has been increasing in recent years. Means for supporting independent living of persons with dementia is needed so as to delay admission of them to nursing home due to increasing needs for care.

As means for supporting the lives of persons with dementia, assistive products for compensating cognitive functions have been researched and developed mainly in Europe and the U.S. for more than 10 years. These assistive products are quite new and thus require further research on effect validation and fitting test methods for establishing adequate rehabilitation methods by using products. It is useful, however, to share information on the products that can be helpful for their lives based on the accomplishments obtained at present and utilize the products. This manual introduces domestic and overseas typical assistive products for which the Center has been conducting information collection, development, and practical application for seven years.

Another objective of this manual is to propose a viewpoint that regards dementia as a “disability.” In the past, dementia was confused with the general aging phenomena, and it was once thought that it was inevitable that people suffered from dementia as they got old. However, clarification on the mechanism of dementia development, thanks to recent advances in medicine and care, has made it possible to improve dementia symptoms by drug and/or non-drug treatments. On the other hand, despite these improvements, persons with dementia still face a lot of difficulties in their daily activities. This manual regards dementia-induced difficulties in daily activities as “disabilities” and introduces assistive products as a means for alleviating the disabilities.

Chapter 1.

Dementia as Disability

Dementia is defined as the condition where memory functions and other cognitive functions have become underactive to the extent that they cause problems in daily activities due to organic brain changes that are caused by cerebral vascular disease, Alzheimer's disease, or other factors (Long-Term Care Insurance Act.) The features of dementia are progressiveness and diversity of the symptoms. Residual functions are kept normal in traumatic higher brain dysfunctions, while in Alzheimer's disease and cerebral vascular dementia, cognitive functions decline gradually or in a stepwise fashion. Accordingly, content and degree of the symptoms vary as the disease gets serious. Furthermore, because various symptoms exist together, persons with dementia face disabilities in various situations in their daily activities. In this way, it is necessary to view the background symptoms from these two aspects, progressiveness and diversity, in order to understand the disabilities faced by persons with dementia. Based on the above, this chapter starts with an outline of the course and content of the symptoms and then the disabilities of individuals with different stages of the disease.

1. Symptoms of Dementia

1) Underlying diseases and progression

Among almost 100 underlying diseases of dementia, typical ones are Alzheimer's disease (accounting for 50% of the total), which is a degenerative disease, and cerebral vascular diseases (accounting for 30%) such as cerebral infarction and cerebral hemorrhage. In Alzheimer's disease, decline in cognitive functions progresses continuously and relatively gradually, while in cerebral vascular diseases, it progresses in a stepwise fashion, every time a seizure occurs.

The actual progression and prognosis of the disease vary depending on age at the onset of the disease and on the individual. In the case of Alzheimer's disease, it is generally known that dementia progresses more rapidly when it develops at a younger age, and there are some cases of dementia having developed at an older age where no progress is observed. Life expectancy varies greatly between individuals and is said to be from several years to as long as 20 to 30 years¹⁾. In recent years, while early diagnosis has been facilitated, drug treatments for delaying the progression of Alzheimer's disease have been started. Therefore, it becomes more and more important to assist persons with mild dementia for improving their QOL.

2) Core symptoms and peripheral symptoms (BPSD : Behavioral and Psychological

Symptoms of Dementia)

Symptoms of dementia are classified into core symptoms that are directly caused by killing and loss of brain cells (Alzheimer's disease) or brain damage (cerebral vascular dementia) and peripheral symptoms that occur secondarily when environmental and psychological factors are added to core symptoms.

Typical examples of core symptoms include memory disability, disorientation, agnosia, apraxia, and aphasia. Memory disabilities, in particular, episode memory problems of forgetting the entire event, are symptoms that are observed most commonly in patients with dementia such as Alzheimer's disease. Disorientation, also observed in many persons with dementia, is a loss of sense of time and place. There are several types of agnosia and apraxia, including spatial agnosia (inability to recognize the space correctly) and ideomotor apraxia (leading to difficulty in the correct use of tools). In aphasia, language functions such as "listening," "speaking," "reading," and "writing" are disabled depending on the damaged portions of the brain.

Typical examples of peripheral symptoms are paranoia and wandering. Much of paranoia is the delusion of persecution, such as the "delusion of theft," which is a belief that the person's valuables have been stolen. Delusion of theft causes the patient to interpret the inability to find his/her item as it having been stolen by a surrounding person. This delusion results from impaired memory and forgetting where he/she placed his/her item, such as a wallet, and is triggered by a stress felt by being taken care of. Wandering is classified into some patterns such as getting lost due to place disorientation and walking around to relieve concerns.

Currently, there is no practical radical treatment for core symptoms, except for dementia, which is curable with surgical operation. Therefore, treatments for core symptoms are limited to administration of a drug to delay progression and rehabilitation to prevent disuse hypofunction of the brain. Accordingly, assistance by personal care and/or products is needed to compensate for declining cognition functions in daily activities.

For peripheral symptoms, recent research results revealed that proper care and drug treatments could alleviate the symptoms. However, assistance is needed for symptoms that cannot be fully alleviated by drug treatments. In this field, devices (wandering detector, etc) have been used reactively as tools for particularly supporting personal care. On the other hand, attention is drawn to the use of devices from a viewpoint of preventing peripheral symptoms and as a direct assistance for the person with disabilities.

2. Disabilities Caused by Dementia

This section explains disabilities in daily activities for each of the three stages in the progression of dementia, initial, mid, and advanced stages, by using the most common case of Alzheimer's

disease as an example.

1) Initial stage

The major disability in the mild stage of dementia is memory disability, particularly, impairment of recent memory for several minutes to several days and an episodic memory problem of forgetting various events in daily activities. A person suffers from disorientation, though mild, and does not know the date (year, month, and day).

There are three features in the initial stage¹⁾.

(1) Episodic memory problem: At the onset, memory loss is not taken seriously, and the person just knows that “something is different from the norm.” However, this memory loss leads to troubles, such as forgetting to shut off the heat and burning the pan, that interfere with daily activities.

(2) Anosognosia: A person cannot recognize the underlying cause for a trouble, i.e., why it occurred, etc.

(3) Sense of life being not going smoothly: Though the person forgets individual episodes, there is a lingering sense that “life is not going smoothly” due to failures in daily activities. Furthermore, the person has a vague sense of unease or a premonition of “ego being destroyed.”

A person with dementia in the initial stage faces a situation “where the person is not able to do things that he/she was previously able to accomplish.” In this stage, assisting measures would be necessary to avoid “failures” and keep the person’s ability of accomplishing things by compensating cognitive functions. As a collateral problem with “not able to do things,” due to anosognosia, the person gets confused by being put in a situation where it is hard for him/her to understand. As a result of the patient trying to address the situation by himself/herself, psychological symptoms such as delusion of theft are developed. Even such psychological symptoms can be prevented by maintaining the person’s independence as much as possible through utilization of assistive products in addition to consideration by the surrounding people. Furthermore, it is also important to prevent failures and confusion before they occur and avoid or resolve a “situation that is hard to understand.”

2) Intermediate stage

In the intermediate stage, disorientation gets remarkable. Not only temporal orientation but also spatial orientation is depressed. In terms of memory disability, in addition to recent memory, long-term memory is impaired. As a result, there are more things that the person does not understand, and it becomes more difficult for the person to acquire necessary

information to keep daily activities and address the situation. In this stage, in addition to the products required in the initial stage, assistive products for compensating spatial disorientation are needed.

The problem “not able to do things that he/she was previously able to accomplish” becomes more serious, which increases confusion and affects his/her psychological condition. As a result, the person is more likely to develop behavioral disorders represented by wandering. Even for these behavioral disorders, assistance to the underlying core symptoms would be needed like in the initial stage. As a means for this purpose, devices would be helpful for maintaining temporal and spatial orientations. Furthermore, emotional stability is also important to prevent peripheral symptoms, and products helping stabilization are also needed.

3) Advanced stage

In the advanced stage, words are lost, causing difficulty in communication. The person suffers from serious physical problems such as gait disorder, incontinence, and dysphagia. For physical care, conventional assistive products for care givers are used. For communication and other dementia-specific care, only limited device-based approaches are effective.

Chapter 2.

Assistive Products for Persons with Dementia

1. Products for Compensating Disabilities in Memory , Orientation, or Attentional Function

1) Assistive products for medication

<Applicable persons>

Persons with mild to moderate dementia

<Difficulties in daily living>

(1) The person often forgets to take medication.

(2) Persons cannot remember if they have taken their medication and thus take it twice.

(3) Persons are not able to take medication unless they are prompted.

<Assist by using the products>

“Automatic pill dispenser” is used to alert the users when to take their medication. Furthermore, the pill dispenser allows the users to take out only a dose of medication and prevents them from taking their medication twice or taking the wrong medicine.

<Functions of the assistive products>

The product has a function of alerting the user when to take their medication with beeping sounds or flashing lights and/or a function of taking out a dose of medication and prevent the user from taking excessive medication. It would be practical if it were possible to put pills for about one week into the pill dispenser. Some products may have a function of having the alarm ringing until the user takes out medication from the pill dispenser to make sure that the user takes their medication or a function of informing the user’s family of their usage information via a communication function.

<Example of assistive products>

“Automatic pill dispenser” (Fig. 1)

At a pre-set medication time, a case accommodating pills automatically rotates so that only a dose of medication can be taken out. At the same time, the alarm goes off and the red lamp on the cap flashes, which prompts the person with dementia to take medication. The case has a mechanism where the alarm is stopped by the motion of turning over the case for taking out the pills. The alarm duration time can be selected from the range of 5 to 60 min. Multiple doses can be set for medication time. It is possible to put pills for 28 doses at one time (for one week if four doses per day and for one month if one dose per day).

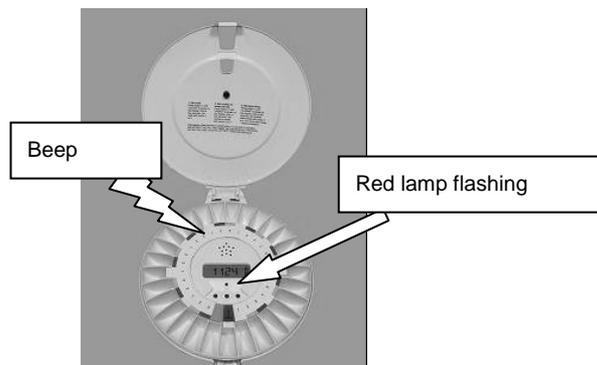


Figure 1 Automatic pill dispenser
At medication time, the user will be alerted by sound and flashing.

2) Automatic calendar

<Applicable persons>

Persons with mild to moderate dementia

<Difficulties in daily living>

- (1) Not knowing the date, the person, out of anxiety, repeatedly asks their family about the date.
- (2) Not knowing the day of the week, the person does not know the schedule of day service, etc.
- (3) Not knowing the time zone (day or night), the person goes out in their neighborhood or makes a phone call to the family at night.

<Assist by using the products>

“Automatic calendar” is used to automatically inform a user with dementia of the date since the user faces more difficulty in knowing the date or the day of the week from the calendar or newspaper. Furthermore, “Automatic calendar (with a time slot display function)” is used because the user faces more difficulty in knowing the time slot from the surrounding conditions and their memory with progression of dementia.

<Functions of the assistive products>

The products have a function of displaying the date and the day of the week in large characters, a function of displaying them in highly contrasted colors, and/or a function of displaying them in an eye-catching LED. These functions are for displaying the date and the day of the week in an easy-to-see manner. Some products display whether it is a daytime or nighttime in order to prevent day-night reversal.

<Examples of assistive products>

“Automatic calendar (English version)” (Fig. 2)

The day of the week, month, and date are displayed in white letters on a black plate, which makes it easy to read characters because of the high contrast. The plate, which is automatically switched mechanically, also displays the leap years. Since this calendar is combined with an analog clock that the elderly people are familiar with and use every day, the user can easily notice the information on the date.

“Automatic calendar (Japanese version)” * Prototype (Fig. 3)

Month, date, and day of the week are displayed using red LED on the black background. The user can easily notice the information on the date because of red light emissions, which are easily recognized by a person with dementia.

The day of the week, date and month, and time zone (morning, afternoon, evening, or night) are displayed in black letters on a liquid crystal screen with yellow-green backlight. The backlight enables the user to read the letters easily and confirm the display even at night.

A printed photo of a flower providing a sense of the season can be inserted into the calendar so that the user can find the information on the date using the photo as a mark.



Figure 2 Automatic calendar (English version): Month, date, and day of the week are displayed in large letters.

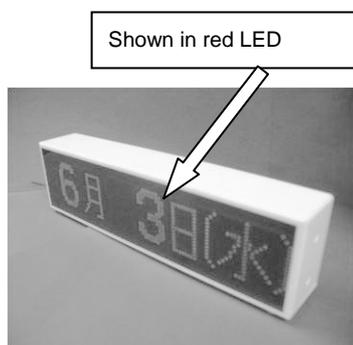


Figure 3 Automatic calendar (Japanese version) * Prototype: Month, date, and day of the week are displayed in prominent red LED.



Figure 4 Automatic calendar (with time slot function): Month, date, and day of the week are displayed together with an eye-catching photo.

3) Assistive products for grasping schedule

<Applicable persons>

Persons with mild to moderate dementia

<Difficulties in daily living>

- The person is not able to remember the schedule or recall it at appropriate timing
- Not knowing the schedule, the person repeatedly asks the schedule.
- Since the person does not know the schedule, he/she lacks the ability to predict.

<Assist by using the products>

“Schedule reminder” for informing the user of the schedule or “Day planner” for enabling the user to visually check the plan is used.

<Functions of the assistive products>

The products have a function of displaying the current time by audio or visual presentation and letting the user know of the schedule of the day and/or a function enabling easy setting of the schedule. Audio presentation includes informing the user of the schedule at a predetermined time, while visual display includes display time in an easy-to-see manner and the schedule along the time.

<Examples of assistive products>

“Schedule reminder” (Fig. 5)

“Schedule reminder” plays back a message, which has been recorded in advance at a specified time on a specified day of the week. Repetitive schedule such as that on a specific day of the week can also be specified. In the input portion, the schedule can be set by pressing with an exclusive pen, and the output portion may be separated and carried easily. The message is played back repeatedly every several minutes, and the user stops it from playing back by pressing down the “OK button” once they get the message. If the user fails to listen to the message, they can press down the “? button,” and then be able to check the most recently played message. Furthermore, the user can check the day of the week and time on the output portion, and confirm the date and time in audio by pressing the “date and time check button.”

“Day planner” (Fig. 6)

The current time is displayed using a red lamp on the left side, and users can use the “Day planner” by writing their schedule of the day. It may also be possible to call for attention by an alert sound at a scheduled time. A blue lamp turns ON at the right side, by which the user can confirm that it is nighttime. The “Day planner” can be hung on the wall of a bedroom of an individual house.

“Day planner (with message display function)” *Prototype (Fig. 7)

This day planner is designed for use in a situation where multiple persons with dementia

live in a group home or institution. In addition to the current time displayed using a red lamp, the next schedule is displayed in a text format on the electrical board. In order to call for attention at a place where many notices are posted, the frame and background are colored in red and yellow, respectively.

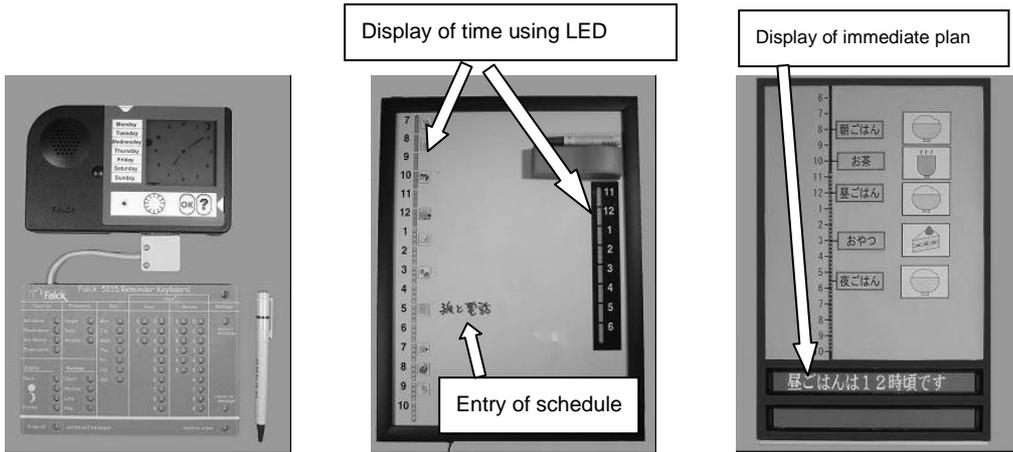


Figure5 Schedule Reminder: Schedule Reminder plays back a message, which has been recorded in advance at a specified time on a specified day of the week.

Figure 6 Day planner: Time is displayed using red lamp, and the schedule is entered along the displayed time

Figure 7 Day planner (with message display function) * Prototype: Time is displayed using red lamp, and the schedule is entered along the time. The immediate plan is displayed by text.

4) Lost item finder

<Applicable persons>

Persons with mild to moderate dementia

<Difficulties in daily living>

- Forgetting where the person put the remote controller, wallet, etc., the person often looks for it.
- Forgetting where the person put an item, the person loses it.
- Having tucked away the wallet and passbook, the user does not know where they have gone.
- Wallet, etc. has not been found, which may cause delusion on theft, saying that someone came in and stole it.

<Assist by using the products>

“Lost item finder” is used for informing the user of where the item is placed. Since it is difficult for persons with dementia to learn how to use it and to use it by themselves except at a very initial stage of mild dementia, the caregiver uses this product to assist the person with dementia for looking for the item.

<Functions of the assistive products>

The product has a function of communicating between a receiver attached to a thing the person often loses and a transmitter using radio wave, etc. and of informing the user of its place with a beeping sound, etc. from the receiver. Some products emit an alarm sound if the distance between the transmitter and the receiver exceeds a certain amount.

<Example of assistive products>

“Lost item finder” (Fig. 8)

Key holder-type receivers have been attached to items easily lost. When the user presses the number button on the transmitter for searching for the item, the sound of the receiver to which the number is assigned will go off to inform the user of the place of the item. There are four receivers in total, which have different colors: red, yellow, green, and blue and emit different sounds.

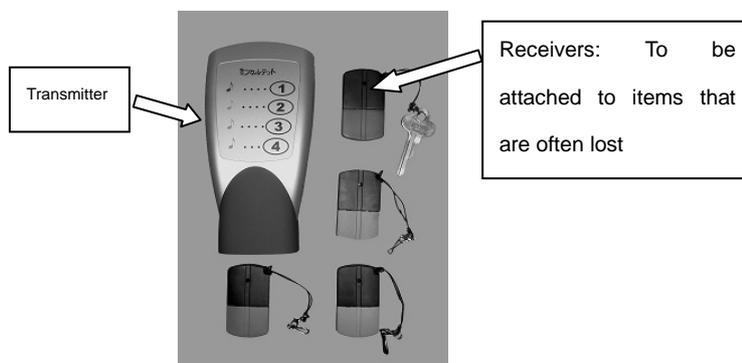


Figure 8 Lost item finder: When the number button is pressed, the receiver emits a beeping sound.

5) Memo tools

<Applicable persons>

Persons with mild dementia

<Difficulties in daily living>

- The person quickly forgets what he/she heard or wants to remember.

<Assist by using the products>

For an elderly person who has been accustomed to writing by hand, “Wearable notepad” is used so that the user can record information when the user hears it or comes up with it. Furthermore, “Memory support notebook,” in which necessary information can be sorted out and summarized, is used for storing and utilizing the record.

“Audio memo” is used for a user who has difficulty in writing letters or for a simple content for saving the trouble of writing.

<Functions of the assistive products>

The products have a function of being wearable so that the user will not forget what was written in the memo, a function of allowing entry of necessary information for each day, and/or a function of easily recording and playing back voice information.

<Examples of assistive products>

“Wearable notepad” (Fig. 9)

A notepad and a small pen have been set in a broach or bolo tie. The user can take a memo at any time by always wearing this notepad.

“Memory support notebook” (Fig. 10)

The user can write down “what to do today,” “what has been done and whom the user met,” “payment and earning,” “meals,” “medication,” “what to be remembered,” and “future plan” collectively in a single notebook. The right side is to be written on and the left side is blank where receipts and/or photos, etc. can freely be attached. It is also possible to attach a memo written in the wearable notepad to this notebook as it is.

“Audio memo” (Fig. 11)

By removing the rubber cover on the back and pressing the record button, audio memo as long as 70 seconds can be recorded. For playing back, the button on the top is to be pressed. With accessories such as strap, band, etc., the memo can be hung from the neck or attached to the arm.

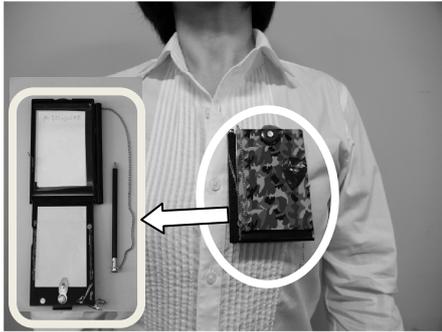


Figure 9 Wearable notepad:
The inside of the brooch is a notepad.



Figure 10 Memory support notebook:
Necessary information can be written for each day.

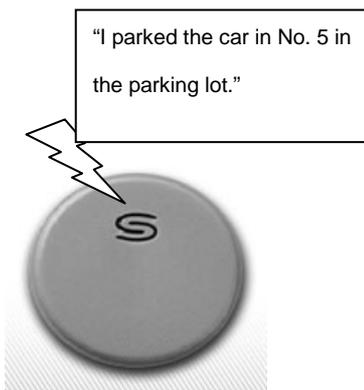


Figure 11 Audio memo:
measures for preventing forgetting things by recording and playing back voice easily

6) Assisting cognition in the toilet

<Applicable persons>

Persons with moderate dementia

<Difficulties in daily living>

- The person has difficulty in recognizing the location of the toilet.
- The person has difficulty in distinguishing between the white toilet and the white floor and wall, because of low-contrast colors.

<Assist by using the products>

Something in a primary color, such as red or blue, is attached on the toilet seat so that the user can easily recognize the position of the toilet. Other than using “Colored toilet seat” (Fig. 12), in which the toilet seat itself is colored, a conventional toilet seat may be covered with a plain-colored toweling cover. Instead of the toilet seat, the wall is sometimes colored. In particular, when a portable toilet that is difficult to be colored is used, it would be better to color the wall. Use of a dark-colored towel would also be preferable.

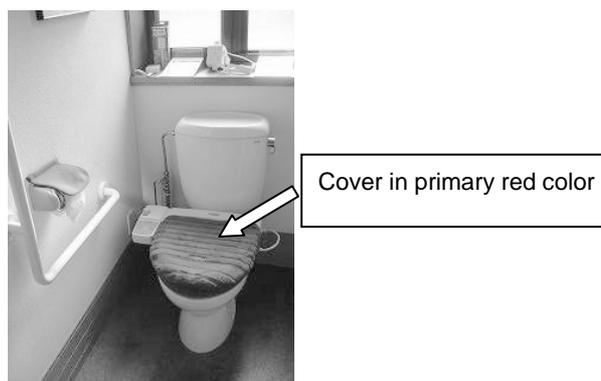


Figure 12 Colored toilet seat:

A cover in a vivid primary color facilitates the recognition of the toilet position

7) Wheelchair with automated brakes

<Applicable persons>

Persons with mild to severe dementia

<Difficulties in daily living>

- Forgetting to apply brakes, the person stands up from the wheelchair or transfers to other places such as beds and toilets.
- There is a danger of fall when the person stands up or returns to the wheelchair, since brakes have not been applied.

<Assist by using the products>

By using a “Wheelchair with automated brakes,” the brakes will be applied automatically even if a person with dementia forgets to apply brakes. In the case where the person needs to be watched over because of danger when standing up or transferring even if brakes have been applied, “Stand-up notification sensor” or the like is used for informing the caretaker of the person being about to leave the wheelchair.

<Functions of the assistive products>

The products have a function of sensing a person being seated and transmitting the information to the brakes. Some products mechanically transmit the motion of the seating surface to the brakes by means of the link mechanism, belt, wire, etc. The products are classified into those using ordinary brakes attached to the wheelchair and those having exclusive brakes.

<Example of assistive products>

“Wheelchair with automated brakes” (Fig. 13)

When the user stands up from the wheelchair, the seating surface is raised by spring force, and brakes are applied in conjunction with this. Brakes are released only while the user is sitting on the wheelchair.

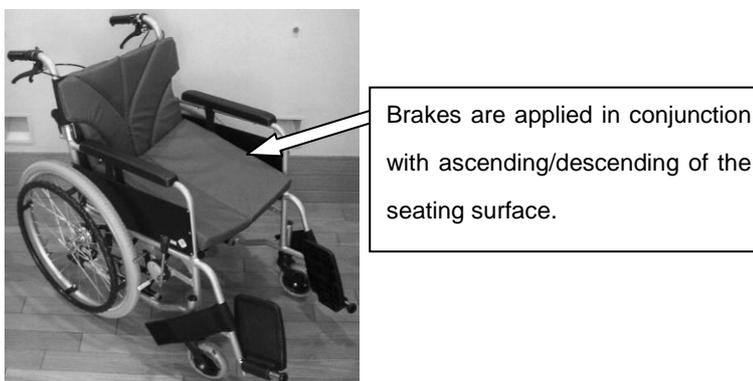


Figure 13 Wheelchair with automated brakes:
When the user stands up, the seating surface will
be raised and brakes will be applied.

2. Products for Alleviating Cognitive Load

1) Simple remote controller

<Applicable persons>

Persons with mild to moderate dementia

<Difficulties in daily living>

- The user has difficulty in operation if there are many buttons on the remote controllers.
- The user has difficulty in remembering correspondence between numbers and channels.
- When using multiple remote controllers, the user cannot work out which controller is used for what and cannot remember how to operate them.
- The user tends to lose a remote controller.

<Assist by using the products>

“Simple TV remote controller” with fewer buttons or “Simple TV remote controller (with different buttons)” enabling the setting of channels with differently shaped buttons is used. When multiple remote controllers are to be operated, infrared “Multiple remote controller” is used for collecting operations of multiple home appliances.

<Functions of the assistive products>

The products have a function of facilitating cognition of the places and types of buttons. This function is achieved by the reduced number of buttons, an eye-catching color, differently shaped buttons, etc.

<Examples of assistive products>

“Simple TV remote controller” (Fig. 14)

A simple remote controller in which the number of buttons has been reduced to only six for power, changing channels (UP/DOWN), changing volume (UP/DOWN), and mute (noise cancelling).

“Simple TV remote controller (with different buttons)” (Fig. 15)

A remote controller in which the five channel buttons have not only different numbers but also different shapes: rectangle, triangle, pentagon, round, and star shape so that the user can easily remember the TV channels they like.

“Multiple remote controller” (Fig. 16)

Ten big buttons are located on the controller to which operations for commonly used TV set, CD player, air conditioners, etc., can be assigned. Seals indicated with numbers, letters, and illustration in a way easily recognized by the user can be affixed onto the buttons.



Figure 14 Simple TV remote controller with only six operation buttons



Figure 15 Simple TV remote controller (with different buttons) having five operation buttons with different shapes



Figure 16 Multiple remote controllers with 10 big buttons

2) 1-button radio/CD player

<Applicable persons>

Persons with mild to moderate dementia

<Difficulties in daily living>

- Unable to remember how to operate the common radio and/or CD player, the person will get passive or will not listen to radio or music.
- If there are many buttons, the user will be confused on what to press down.

<Assist by using the products>

A device requiring operations as simple as possible is used, such as a device with a fewer buttons by which the user can listen to the radio or CD just by turning the power ON. While the following “1-button radio” and “1-button CD player” are prototypes, there are also commercially available easily operable products such as “Wall-hanging CD player.” If it becomes more difficult for the user to operate a model that the user has been familiar with, it would be better to make the button to be pressed eye-catching using a red tape.

<Functions of the assistive products>

The products have a function of enabling the user to carry out basic operations of radio/CD with a simple operation. The products aim to enable the user to enjoy leisure easily and without fail.

<Examples of assistive products>

“1-button radio” (Fig. 17) *Prototype

The user can listen to the radio just by pressing the power button on the top. The volume adjustment button and other buttons are intentionally hidden from the user since they do not have to be operated once tuned to the user. This product was developed to meet the needs of persons with dementia.

“1-button CD player” (Fig. 18) *Prototype

Like 1-button radio, the CD player enables the user to listen to CDs just by pressing the power button.

“Wall-hanging CD player” (Fig. 19)

The CD player enables the user to playback and stop the CD just by pulling down the power cord at the bottom. CDs can be easily replaced because there is no cover on the player. Low-profile buttons such as volume adjustment buttons and fast-forward buttons are located on the top.



Figure 17 1-button radio:
Radio can be turned
ON/OFF with a single button

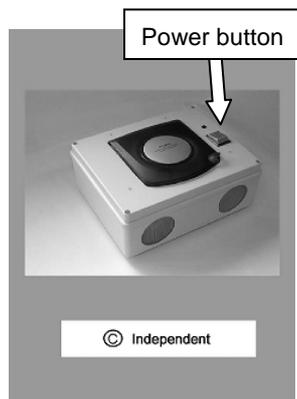


Figure 18 1-button CD
player: CD player can be
turned ON/OFF with a
single power button.



Figure 19 Wall-hanging
CD player: CD player can
be turned ON/OFF by
pulling down the power
code.

3) Telephone with photo buttons

<Applicable persons>

Persons with mild to moderate dementia

<Difficulties in daily living>

- The person forgets a telephone number.
- The person does not know how to operate the phone.
- The person is confused if there are many operation buttons.

<Assist by using the products>

“Telephone with photo button” enabling the user to make a phone call just by pressing the button attached with a face photo is used. For persons with advanced dementia who may be confused by many number buttons at the bottom, “Simple phone with photo buttons” is more preferable because the number buttons can be covered and the phone has a fewer buttons with a face photo.

<Functions of the assistive products>

The products have a function of allowing a phone number to which the user often makes a call to be registered in a button and enabling the user to easily understand where the user is calling. Some products have a function of hiding the number buttons to avoid confusion in cognition at operation by reducing the number of the operation buttons.

<Examples of assistive products>

“Telephone with photo buttons” (Fig. 20)

Nine buttons are arranged on the top. Abbreviated dialing numbers can be registered in the nine buttons, and photo, sketch, and letter can be attached on the buttons. The user can make a phone call just by pressing this button. A sound-volume-adjustment lever is provided at the bottom so that an elderly person with dementia and impaired hearing can share a single phone with the family.

“Simple phone with photo buttons” (Fig. 21)

In this simple phone, the number of the buttons with a face photo has been reduced to four, and the number buttons that can be confusing are covered with a white cover. This phone is more preferable in order to allow a person with dementia to continue using a phone as long as possible.



Figure 20 Telephone with photo buttons: A call is made by pressing call-out button attached with photo



Figure 21 Simple phone with photo buttons: A cover for hiding number buttons is provided.

3. Products for Promoting Emotional Stability

1) Therapy doll

<Applicable persons>

Persons with moderate to severe dementia

<Difficulties in daily living>

- The person feels anxiety or loneliness.
- The person sometimes gets restless and feels like raising voice because of impatience
- The person feels stressed because his/her position has been changed from a position of caring a kid, etc. to a position of being cared.
- The person has difficulty in conventional communication such as chatting.

<Assist by using the products>

Emotional stability of the user is promoted by talking to “Talking doll,” which talks to the user in various ways or by taking care of “Baby doll for doll therapy” simulating a newborn baby. In addition, treating a “Seal-shaped communication robot” kindly gives healing effects and activates communication with surrounding people.

<Functions of the assistive products>

A doll with a shape of baby or animal has a function of responding by opening/closing the eyes, making a voice, and moving the body in the ways how the user moves or operates the doll.

<Examples of assistive products>

“Baby doll for doll therapy” (Fig. 22)

This is a doll to be held, put in bed, and taken care of. The doll feels soft like a real baby and gives holding comfort.

“Talking doll” (Fig. 23)

Like a baby doll, the talking doll is not only being taken care of but also playing back a message stored in it if the doll recognizes a voice or gentle stroke.

“Seal-shaped communication robot” (Fig. 24)

This is a therapy robot mimicking a seal. The stuffed animal incorporates artificial intelligence and various sensors and responds to soft stroke and voice.



Figure 22 Baby doll for doll therapy: The dolls give a sense as if the user is holding a real baby.



Figure 23 Talking doll: The dolls talks when the user touches the hand, etc. of the doll.



Figure 24 Seal-shaped communication robot: The robot responds by crying or moving the body if stroked or talked.

2) Recall assistive device

<Applicable persons>

Persons with moderate dementia

<Difficulties in daily living>

- While the person can retain memory from the past for a relatively long period of time, he/she cannot retain recent memory.

<Assist by using the products>

Mood is enhanced by recalling good old days the user remembers by using “Recall assistive device.” Examples of the recall assistive devices are “Sketch cards,” in which old house wares are drawn, and “DVD containing old songs and images.”

<Functions of the assistive products>

The products have a function of presenting articles the user used and/or music the user listened to in their youth of which they can remember. This device is used in reminiscence therapy.

<Examples of assistive products>

“Sketch cards” (Fig. 25)

Cards in which old farming tools and house wares are drawn. Color illustrations are provided on white background to facilitate recognizing the subject. On the back of the card, a question or other text is written as a clue for recalling.

“DVD of good old school songs” (Fig. 26)

This DVD contains school songs, which the elderly people are familiar with since their childhood together with the related images. Since the words of songs appear as captions, the user can sing a song along with the captions. Songs are sung by an easy-to-hear male voice.



Figure 25 Sketch cards: Old farming tools and house wares are drawn.



Figure 26 DVD of good old school song: Nostalgic songs have been recorded.

Chapter 3.

Case Studies of the Use of the Products

This chapter introduces the examples of actual use of the products explained in the previous chapter.

1. Assistive Products for Medication

<Ms. A>

79-year-old female living alone (in her own house), MMSE score 22 points

<Difficulties in daily living>

Ms. A's family prompts her to take her medication twice a day (morning and evening). Because of anosognosia, she is not aware of the need to take medication because she believes there is nothing wrong with her.

<Assist by using the products>

“Automatic pill dispenser” was used. Ms. A does not know indication or dosage even if she looks at the pill dispenser. Therefore, the explanatory text “please turn over the pill dispenser and take out and take medication, when the buzzer goes off” with a signature of the family was affixed to the case as shown in Fig. 27. On the first day when this product was introduced, the family practiced her on taking out drugs after beeping for 7 to 8 times.

<Efficiency of the products>

At the initial stage of the practice, the user was not able to take out pills by herself, but she had acquired the ability of doing it by herself by 7th to 8th time. She started using the product from the next day; since then, she has been able to take pills by herself without a reminder call. Though she is still unaware that she is taking drugs, when the buzzer beeps, she spontaneously grabs the pill case and takes medication. The burden of the family to make a phone call at specified time has been resolved by use of the product.



“ please turn over the pill dispenser and take out and take medication, when the buzzer goes off”

Figure 27 Explanatory text on the pill dispenser

2. Electronic Calendar

<Ms. B>

81-year-old female living alone (in a pay nursing home), MMSE score 21 points

<Difficulties in daily living>

Nervous about not knowing the date, Ms. B asks what date it is at least 10 times a day when the family comes. She does not know the date even if she looks at a calendar.

<Assist by using the products>

“Electronic calendar (Fig. 3)” was used. The calendar was placed near the bed where she usually spends long hours. One week after the introduction, the family urges her to look at the product every time she asked the family about what date it is.

<Efficiency of the products>

Within one week after introduction, the number of times Ms. B asks the family about the date had been decreased, and it has become a habit to check the date. Currently, she says she checks the date every morning at the time of awaking and looks at the calendar several decades of times a day. Therefore, she is no longer puzzled or feels uneasy because of not knowing the date, and the burden on the family has been alleviated.

3. Assistive Products to Grasp Schedule

<Ms. C>

88-year-old female living in a group home, NM scale 31 points

<Difficulties in daily living>

Not knowing the schedule of a day, Ms. C repeatedly asks staff member or other residents about the mealtimes. Because she was not able to prospect how long before the meal is ready, she kept waiting for meals in a dining room for a long time or her behavior was in other ways constrained.

<Assist by using the products>

“Day planner with automated plan display function” has been applied, so that she can visually check the mealtimes. Day planner is installed as shown in Fig. 28 on the wall of the restaurant where residents spend long hours.

<Efficiency of the products>

Within one month after the installation, Ms. C had been gradually aware of the products and it had become a habit to check the mealtimes using the products. Before introduction, if she wanted the mealtimes, she was able to identify them only when she asked the staff member about the time, that is, 50%. After the installation, however, she has become able to identify the mealtimes by looking at the products, even if she does not know them even after asking other residents. Because she now knows the mealtimes, selectable range of behaviors has

been expanded like taking a rest on her own before the meal.



Figure 28 Installation of day planner

Conclusion

This manual has proposed a point of view of regarding difficulties in daily life caused by dementia as “disability,” and introduced assistive products as means for alleviating the disabilities caused by dementia.

As explained in Chapter 1, with the advancement of dementia, contents and degrees of disabilities vary. In addition, various disabilities are generated in various scenes in daily activities. It is expected that these disabilities can be alleviated by using “products for compensating memory loss and disorientation,” “products for alleviating cognitive load,” and “products for promoting emotional stability,” as shown in Chapter 2. Chapter 3 introduces the cases where the users have been able to take medications by themselves by using assistive products for medication and identifying the date by using an electronic calendar. In the future, it is necessary to proceed with the validation of the effects and research on the fitting test methods for establishing life-supporting methods for persons with dementia by the use of such products.

Reference

1 Isao Ozawa, What is dementia? Iwanami Shoten, 2005